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Please to address, "Edward Newman, 9, Devonshire Street, Bishopsgate, London, N.E.," to whom Post-Office Orders may be made payable, at the Bishopsgate Street Money-Order Office. Payment may also be made in Post-Office Stamps.

'*A Catalogue of the Lepidopterous Insects in the Museum of Natural History at the East India House.*' By **Thomas Horsfield**, M. & Ph. D., F.R.S., Keeper of the Museum; and **Frederic Moore**, Assistant. Vol. II. London: Allen & Co., Leadenhall Street. 1859. 8vo; 160 pp. letter-press; 15 plates. Price 10*s.* plain, 20*s.* coloured.

It is impossible for any one who has taken the interest I have always done in the arrangement of Lepidoptera not to hail with gratitude the appearance of a work which professes to reflect the opinion of one who possessed almost unbounded materials, and who, for many years, made this subject his especial study. The late lamented Dr. Horsfield's account of the advantages he possessed is given in the following words:—

"I lived at this time at Surakarta, a province in the interior [of Java] belonging to the native princes. I was amply provided with every convenience and facility for preserving what I had collected. Several draughtsmen had likewise been trained under my superintendance, for botanical delineations; and the skill they acquired in those soon fitted them for the annulose department. I was therefore enabled to enter upon a history of the metamorphoses of Javanese Lepidoptera, a design which has long engaged my anxious solicitude. Although I did not at this period so fully conceive the paramount necessity of an acquaintance with the metamorphoses of Lepidoptera, towards the establishment of a natural arrangement, as I have been led to do in later periods, yet I was so strongly impressed with its essential importance in attempting a complete history of insects, that I commenced with a fixed determination to prosecute the inquiry with unremitted industry and zeal, to collect all the larvæ of Lepidopterous insects which I might possibly obtain, and to trace them through the various periods of their existence. With this view I fitted up a large apartment adjoining my residence with breeding-cages and receptacles for chrysalides. At the commencement of the rainy season, the period when, in tropical climates, the foliage of vegetables is renewed, I daily went out in search of caterpillars, accompanied by the most intelligent of my native assistants. The caterpillars thus collected were placed in separate breeding-cages, and several of the assistants were instructed to provide daily, at regular periods, the food the individuals required, and to secure the cleanliness of their cages. As soon as the caterpillars were approaching to

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perfection a drawing was made of them. The same individual which had been submitted to the draughtsman was then separately confined, watched with the most diligent care, and, as soon as it had passed into the state of a chrysalis, again made the object of the pencil. A determinate number was carefully attached to the drawing and to the cage of the chrysalis. As soon as the perfect insect had appeared and expanded its wings it was secured, set, and numbered in accordance with the larva and chrysalis. During this period every possible solicitude was employed to prevent mistakes. The original series, consisting of the perfect insects and the chrysalides obtained by this mode of proceeding, and numbered in accordance with the collection of drawings made at the same time, is now deposited in the Museum of the Honourable East India Company, and affords an authentic document of the accuracy of the details regarding the metamorphoses of Javanese Lepidoptera, which will be offered in the course of this work."

Dr. Horsfield does not claim the merit of being the first to consider the larva as important in the natural classification of Lepidoptera, but he is the earliest English author who calls our attention to the invaluable work of Denis and Schiffermuller, whose maxim and motto of "One eye to the butterfly and another to the caterpillar" he cites with the cordial approbation it deserves.

It does not, however, seem to me that either the authors of the now celebrated Vienna Catalogue, or Dr. Horsfield himself, carried out the obviously important principle which both profess to admire. Denis and Schiffermuller commence by adopting the Linnean primary groups as final; and Dr. Horsfield by restricting his divisions to five, in accordance with MacLeay's singularly clever but most artificial hypothesis, thus grouping the whole of the Lepidoptera into Papilionidæ, Sphingidæ, Bombycidæ, Noctuidæ and Phalænidæ, and entirely ignoring as divisions such groups as Geometra, Pyralis, Pterophorus, Tortrix, Tinea and Psyche. Neither is the group Papilionidæ associated by any common character of the larvæ. Then the work before us makes no attempt whatever to pursue the hypothetical arrangement here superficially indicated. The accomplished author of the idea is now no more, and to other hands has been allotted the important task of working out the details, which, I say it without any feeling of disrespect towards the founder, are now unfettered by any attempt to force nature into that harness which none of us can compel her to wear.

The first volume, already noticed, treats of the Papilionidæ and Sphingidæ: the second, now before us, of the third tribe under the name Bombyces, which are divided by characters of the larva into eight Stirps, as follows :—

Stirps 1. Larvæ sphingiformes.
„ 2. „ fasciculatæ.
„ 3. „ ursinæ.
„ 4. „ cuspidatæ.
„ 5. „ verticillatæ.
„ 6. „ limaciformes.
„ 7. „ pilosi.
„ 8. „ lignivoræ.

The first of these Stirps includes :—1st. Those xylophagous larvæ with heliophilous imagos, which form the tribe Sesiæ of Laspeyres, the genus Sesia of Guenée and Doubleday. 2nd. The Zygænidæ. 3rd. The Lithosiidæ and several Indian forms, which have only lately received names in Mr. Walker's 'Catalogue of the Lepidopterous Insects in the British Museum.' It therefore appears that in this first Stirps, although professedly associated on the larval principle, cryptophagous and phanerophagous genera are mixed up together, and the larval principle is thus abandoned as soon as proposed. In any natural arrangement the Sesiæ, being emphatically internal feeders, must be classed with the eighth Stirps, Lignivoræ, comprising Hepialus, Zeuzera and Cossus. The learned author is fully aware of the heterogeneous nature of this first Stirps, and alludes to it somewhat apologetically. As it is impossible to separate Sesia from the other Lignivoræ, so is it unnatural to divorce Eusemia from Callimorpha and Chelonia; and Zygæna, Eusemia, Lithosia, Callimorpha and Chelonia must therefore either constitute two proximate groups running parallel with each other, or be fused together into a somewhat unmanageable whole.

In the second Stirps, Fasciculatæ, the beautifully distinguishing character of the hairy pupa is not rigidly adhered to; and this has led to the introduction of genera which, it appears to me, ought to be excluded. The other Stirps are much in accordance with those now generally adopted.

This question, however, remains. Seeing that the unnatural combination called Sphinx by Linneus is thus broken up, why should the true Sphinges, reduced in the East to the small number of forty-nine species, constitute a separate primary division of Lepidoptera? Their larvæ are beautifully distinct and characteristic, but then so also are those of the Fasciculatæ, Lignivoræ, Ursinæ, Cuspidatæ, &c.; and in no respect are the true Sphinges more distinct, more numerous or more important than either of these.

The numbers of eastern species of the three primary groups or tribes stand thus :—

Tribe I.	Papiliones . . .	595
Tribe II.	Sphinges . . .	49
Tribe III.	Bombyces . . .	346

There is every reason to believe that these numbers nearly represent the proportions of the three groups, and it is therefore clear that the Sphinges are not by their numbers entitled to rank as a primary group. Then their larvæ are not more different from those of the seven characterised divisions of Bombyces than those are from each other; there is, in fact, no reason, logical or entomological, why they should rank differently from the other divisions. I therefore take the ascertained Bombyces of the East as 395. That the recorded Bombyces should be less in number than the Papiliones is not altogether remarkable when we recollect the attractive appearance and diurnal flight of the latter. It will be admitted on all hands that the Bombyces, with or without the addition of the Sphinges, is a most unsatisfactory group on account of its heterogeneous contents; not one of those characters by which we are accustomed to disintegrate the Lepidoptera can possibly be applied to it.

Turning our attention to the Lepidoptera at present untouched by the authors whose labours I am noticing, we find two groups numerically enormous, yet singularly homogeneous in their contents, and singularly distinct from each other; these are the Geometræ and the Noctuæ. They differ essentially both in the larva and imago states; the larvæ of Geometræ have but four claspers, those of the Noctuæ ten; the hind wings of Geometræ have the same pattern or disposition of colours as the fore wings, the hind wings of the Noctuæ have a different pattern from the fore wings; there is no similarity between them. Then we have a group less compact and satisfactory than either of these, composed of the Deltoides, the Pyralites, the Pterophorites. And having eliminated all these,—that is the Diurnes, the Nocturnes, the Geometræ and the Noctuæ, and lastly the compound but unnamed group of which Pyralis is the type,—we have still left on our hands that mass of moths which are now associated from their minute size and usually called Micro-Lepidoptera, but which are probably far more numerous, certainly more diverse, than any of those divisions to which I have alluded; and we have also left those abnormal Psyches or Sackträgers which are bandied about from one division to another because they will amalgamate with none.

In "Sphinx Vespiformis" I hinted that the Psyches might be Phryganidous (see the diagram opposite page 21); and subsequently in the preface to the fifteenth volume of the 'Zoologist,' I raised the grave question, whether the Phryganidæ did not constitute a tribe of Lepidoptera. Now supposing this latter hypothesis to be correct, and it is certainly nothing more than hypothesis at present, we shall assuredly find the Sackträger larva represented among the Bombyces, just the same as we have the cuspidate type of larva, the limaciform type of larva, &c. According to my view, already partially explained, the existence of such groups as the true Nymphalidæ, the Lycænidæ, the Phryganidæ (if Lepidopterous), &c., all so strongly marked by the character of their larvæ, almost necessitates the reappearance of such larvæ in the central and most diversified division of the whole class. I have elsewhere stated my conviction that in such a great division as that of the endosteate animals the existence of such marked groups as fishes, reptiles and birds absolutely necessitates the existence of fish-formed sucklers, reptile-formed sucklers and bird-formed sucklers, otherwise the group associated by the character of suckling the young must be regarded as artificial and unnatural; but we all know how well this marked division bears this test: in the whale and the dolphin the fish is portrayed; in the pangolin and armadillo the lizard and the tortoise are portrayed; and in the bat the bird is portrayed. And this theory of representation is illustrated throughout every part of the animal kingdom, and must be regarded as an essential element in all attempts at natural classification. Thus the existence of Sackträger larvæ among the Lepidoptera, and their occasional appearance in forms least expected, as Perophorus, &c., furnishes a strong reason for assuming the existence of some extensive primary division of Lepidoptera, of which the Sackträger larva shall be the distinctive character. A curious and conflicting fact has lately been discovered in the economy of certain Psyches, that their larvæ are carnivorous; thus while the fact asserted by Pictet that the larvæ of Phryganidæ feed greedily on willow leaves, and thus exhibit a decided approach to the normal character of Lepidopterous larvæ, the larvæ of Psyches, according to the recent observations of Mr. Ealy, actually exhibit a discrepancy just where one would have wished an identity of economy. All these things must be considered in a much more comprehensive spirit than heretofore, or we cannot expect to arrive at truth.

The reflecting entomologist will pause before he accepts any scheme for dividing these vast tribes by any hypothetical number; and should he peruse the labours of Dr. Horsfield he will find that that accomplished entomologist's attention was directed entirely to the larger insects—the Papiliones, Sphinges and Bombyces—and will, I think, not fail to conclude that Dr. Horsfield crowded together the Geometræ, Pyrales and Micro-Lepidoptera simply because he had not studied them.

This work, therefore, although containing the results of a long life's labour and study, can only be regarded, *first*, as furnishing us with unquestionable details of metamorphosis, and, *secondly*, as giving us a continuous and digested list of the Papiliones, Sphinges and Bombyces yet ascertained to be inhabitants of the East. This latter labour has devolved almost entirely on Mr. Moore, and I am sure every entomologist will appreciate highly the great industry, the sterling ability, and the extreme modesty with which his task has been accomplished.

Reverting to the divisions of the larger Nocturnes, it seems evident to those who desire thoroughly to understand them that the larva offers the best character for dividing them into groups; and if we give Dr. Horsfield's first group the meaning which its name implies, "Sphinx-formed," we shall then have eight perfectly natural divisions, and we shall find in each a heliophilous, a heliophobous and other intermediate groups, which may be indicated by placing them in parallel columns.

	Heliophilous Imago.		Heliophobous Imago.
Sphinges.	Macroglossa	Sphinx	Smerinthus
Lignivoræ.	Sesia	Hepialus	Cossus
Lithosiæ.	Zygæna	Nola	Lithosia
Ursinæ.	Glaucopis	Callimorpha	Chelonia

Linneus, misled by exclusive attention to the imago, placed all the heliophilous families in his genus Sphinx, as well as those which possessed the Sphingiform larva; and he thus included a portion of each natural division; so that Smerinthus, Sphinx and Macroglossa were Sphinges on account of the larva; Macroglossa, Sesia (Ægeria of Fabricius), Zygæna and Glaucopis were Sphinges on account of their imago; Macroglossa alone possessing a double claim. All the eight larval divisions of Nocturnes are probably susceptible of similar subdivisions, not indeed into three, but into several groups; but we are compelled to wait for a more perfect knowledge of their metamorphoses.

Those few entomologists who have glanced, even for the purpose of condemning it, at my septenary hopothesis, will recollect that Sphinx formed one of my seven primary groups of Lepidoptera, a guess which I now believe to have been made under the influence of erroneous education, for who is there that does not entertain a belief in the primary importance of some such group? In "Sphinx Vespiformis" I reduced this group by eliminating all those families which did not possess the Sphingiform larva, and which Guenée has subsequently separated. I am now disposed to abandon it altogether, seeing in the family of Sphingidæ, as now restricted, nothing more distinctive or prominent than in the other families into which the Diurnes and Bombyces are by universal consent divided.—*E. N.*

'*The Honey Bee: its Natural History, Habits, Anatomy and Microscopical Beauties.*' By JAMES SAMUELSON. London: Van Voorst, Paternoster Row. 1860. 166 pp. letterpress; eight tinted Illustrations. Price 6*s*.

In this little work the author has gathered together many of the most amusing facts in the history of the honey bee, and has stated them with perspicuity and in an agreeable manner, but he appears to me to rely too entirely on the assertions of others, without taking sufficient trouble to investigate for himself: thus Mr. Samuelson states at p. 63 "that the queen bee is capable of producing and depositing fertile eggs in her virgin state, from which males alone proceed; in fact, it is now tolerably well established that the eggs wherefrom drones are hatched are in no case fertilized by the male element." This hypothesis has been broached by Dzierzon, restated by Siebold, and Siebold has been translated into English by Dallas; but so far from being tolerably well established it rests on the most vague conjecture. The very mention of such hypotheses must be confusing to the young, and for such only Mr. Samuelson's book is adapted.

At present, however, the state of bee lore is very unsatisfactory. As the juries for adjudicating prizes at the Great Exhibition of 1851 broadly pronounced every alteration made in the bee-hive during the last two hundred years to be a retrograde movement, so we may state that our knowledge of bee economy had been retrogressive also; and now that more able observers and more profound thinkers have turned their attention to the hive-bee, we find we have to unlearn almost all that we have learned. Bee literature is a perfect quagmire; there is safe footing nowhere, and Mr. Samuelson's little volume may be characterised as the well-intentioned attempt of a man in a quagmire to extricate himself by leaning on the reeds. The mission of such books is to invite readers to observe for themselves.—*E. N.*

'*The Natural History of the Tineina.*' Vol. V; containing Colephora, Part II. By H. T. STAINTON, assisted by Professor ZELLER, J. W. DOUGLAS and Professor FREY. 228 pp. letterpress; 8 coloured plates. Price 12*s*. 6*d*.

I can say nothing in praise of this volume that I have not already said of its predecessors. The observations are invaluable, and the plates of the highest excellence.—*E. N.*

The New British Rat (Mus Alexandrinus).—In the 'Field' of the 1st of September I see reference made by Mr. Newman to a communication which I read before the Linnean Society some time since respecting a rat which had never before been recognised by any scientific naturalist as a member of the British fauna. My communication was not made to the Zoological Society six months ago, as stated by Mr. Newman, but to the Linnean Society two years ago, when I exhibited several living specimens of the new rat as well as some of the old English black rat (*Mus Rattus*), with which it had by some been confounded. On a subsequent occasion I read a further communication to the same Society, on the distinctive anatomical characters of the two species, especially in reference to their crania. I did not, as stated by Mr. Newman, "speak of the new rat as a novelty;" on the contrary, I mentioned that it had long been known by those who dealt in rats for sporting purposes, but it had, until then, eluded the search of scientific naturalists. Further, I said that the rat would probably turn out to be the Mus Alexandrinus of Geoffroy St. Hilaire, whose figure of that species it resembled. The species of rat now under consideration has long been known to the ratting fraternity as the "ship" rat, or "snake" rat, but is rejected by them on account of its extreme activity, which enables it to scale with a bound the walls of the ratting-pit. This rat is rather smaller than either of the other rats met with in this country. The tail is enormously long, and the ears exceedingly thin and large; the hair of the body is fine and silky, and varies in hue from blackish slate-colour to brown-gray. The thighs are very large and muscular, and doubtless it is this circumstance which enables the animal to bound with such agility. It is very fierce and voracious. That the rat mentioned by Mr. Francis Francis is the new one, and that it is the Mus Alexandrinus, is very probable, but if Mr. Newman were practically acquainted with the difficulty of making out with absolute certainty the specific limits of these cosmopolitan rodents, so subject to variety, so ready to cross-breed, he would, I think, speak a little more guardedly. I have not had an opportunity of comparing an English specimen with an undoubted Mus Alexandrinus from Alexandria, but one of the keepers at the Zoological Gardens, Regent's Park, tells me that some years since several were received from Alexandria, and they were exactly like my specimens. I have recently received some rats from one of the West India Islands; they inhabit and live upon the growing heads of certain palm trees. They are not, as far as external characters go, to be distinguished from the new British rat, and I believed them to be identical, though the West Indian rats average rather larger in size, and are more uniformly of a brown colour. The cranial characters scarcely bear out this idea. In the British Museum, among the stuffed British Mammalia, is a wretched specimen, wretchedly stuffed, of the new rat; but it is incorrectly labelled Mus rattus, the name of the old English black rat, with which I suspect it has long been confounded. The cranial characters of the two are, however, very different, and their differences are such as are not compatible with mere variety—they are specific. I may here mention that my paper on the cranial characters of these two rats, with figures of the skulls, will probably appear in an early number of the 'Proceedings of the Linnean Society.' About two years since I presented three specimens of the new rat to the Zoological Society; one of them died, but the other two are still living in the Society's gardens, and may be found in the small house for Mammalia not far from the fish house. The rats are in good health, but accidents appear to have diminished the length of their tails, and their ears are covered with warts. I cannot conclude this little communication without expressing my belief that our knowledge of the British rats is very imperfect and not a little confused. The different species breed together very freely, and the offspring will breed with either of the parent species, resulting in endless gradations between the two. The new rat breeds freely with the common brown rat (*Mus decumanus*), and, where they mingle, every shade of difference between each species may be found. We have in this country a black rat with a white chest, probably a variety of Mus rattus. In the British Museum there are two stuffed rats (chestnut coloured with white breasts), which were captured in Cambridgeshire, and which are either a distinct species or a very singular variety. A distinguished Irish naturalist, the late Mr. Robert Ball, believed there was still another species of rat in Ireland, which he named Mus Hibernicus. The numerous readers of the 'Field' might do much to clear up our uncertainty about doubtful species or varieties, and any specimens of rats exhibiting peculiarities or unusual appearances I should be very grateful for; and I may add that living specimens would be valued at the Zoological Gardens, Regent's Park.—*James Salter; 1, Plowden Buildings, Temple.*

[I reprint the preceding from the 'Field' newspaper because of its value in a Natural-History point of view, and having done so I cannot courteously omit to notice Mr. Salter's mention of my own name. My knowledge of Mr. Salter's still unpublished communication I admit to have been very limited, and I accept very gladly his corrections as to the name of the Society and the date of the reading. My statements and suggestions about the rat, which are really the gist of the matter, seem corroborated by Mr. Salter's interesting communication. A word, however, about the following paragraph seems necessary. "If Mr. Newman were practically acquainted with the difficulty of making out, with absolute certainty, the specific limits of these cosmopolitan rodents, so subject to variety, so ready to cross breed, he would, I think, speak a little more guardedly." Now I wish most distinctly to disclaim all idea of "making out with absolute certainty the specific limits" of the members of the rat family. Often as rats, black, white and brown, have been brought for me to decide the species, I have always declined doing so, otherwise than in such vague terms as "I think it must be the common brown rat." I have never expressed an authoritative opinion of my own, or felt much confidence in the opinion of others. I have seen in the same litter of rats individuals which appeared to be of the black, and others that appeared of the brown species. This admixture of the two colours has been explained away by supposing the existence of occasional black varieties of the brown rat, and occasional brown varieties of the black rat; but if this be so the names implying colour are not simply inapplicable, but injurious to Science. Whether other characters are more constant than colour I will not pretend to say; I think such constancy of distinctive character has not been made out. I feel strongly inclined to think that geographical races, as the old English black rat, the brown Norway rat, the slender Alexandrian rat, and several others, have been somewhat too readily received as species, and to regard the facility with which these races interbreed, and the extreme fecundity of the hybrids, as evidence both of the unity of the species, and of the instability of the races. The same disposition to vary within certain limits is exhibited in most of our domestic animals, a fact so well known that we either preserve races or alter them at pleasure. Who that compares the bulldog with the grayhound can fail to find in every bone characters of distinction far more marked than between the fox and jackal; and it is only our knowledge of a multitude of facts bearing on the question that induces us to admit, without a moment's hesitation, that the bulldog and grayhound are races and not species. I may add that I have often thought that the confusion existing between race and species has, in some instances, led to the reception of those hypotheses which break down specific limits altogether; we are too apt to argue on this subject on the false assumption that we know how widely the individuals of a species can vary *inter se*: size, form and colour, as specific characters, are certainly set at nought by most of our domestic animals, and yet all naturalists will admit that the horse is as distinct a species as the ass, although one is so versatile, the other so constant in its characters. Supposing the mule to be a fertile instead of a sterile animal, the specific distinction between horse and ass would be very difficult to maintain; and it is thus with rats: supposed specific distinctions are in a multitude of instances broken down by the propensity of such supposed species to interbreed, and by the fertility of the progeny.—*Edward Newman.*]

The African Anteater.—A letter which I have just received from Mr. Thomas Ayres, of D'Urban, Natal, contains the following account of the capture of a specimen of the great South African anteater, which may be interesting to the readers of the 'Zoologist.' "I have lately preserved one of the large anteaters. It is a male, and weighed 61℔s. Its length is 4 feet 6 inches, but I should judge from the softness of its ribs that it was not full-grown. This specimen was shot at night on a neighbouring farm, and, being wounded in the shoulder, was chased to his burrow; a fire was then kept alight for the remainder of the night, which prevented the animal from escaping. Next day eight Caffres were mustered with spades, &c., and set to work to dig the wounded beast out, which they wholly failed in doing. The upper crust of the ground, about four feet in depth, was very hard, gradually becoming more soft and sandy as they proceeded downwards. The ant-bear, the whole time the digging was going on, was constantly heard below, working away with might and main, and although the Caffres worked hard they could not overtake him. The most curious circumstance is that in such cases the animal appears able to work its way to almost any distance under ground without requiring air, in its progression pressing the earth it has removed so forcibly back that it only occupies the same space it did before. How the animal can continue working in this way a whole day is wonderful; they may be said literally to walk through the earth. At sunset the work was given up, and a large gin tiger-trap set amongst the loose earth at the bottom of the pit which had been dug. Next morning the ant-bear had worked his way back and was caught in the trap, but in such a weak state from the inflammation in the wounded shoulder that it was necessary to kill it. Twice I have been present at the attempt to dig anteaters out, and both times totally failed in overtaking them. Had this one not been wounded we certainly should not have got him."—*J. H. Gurney; Catton Hall, Norwich, September* 28, 1860.

The Ostrich in Europe.—At the last sitting of the French Academy of Science, Prince A. Demidoff wrote to announce a second instance of the reproduction of the ostrich in Europe, at his zoological establishment of San Donato. The same female ostrich, which, in 1859, had produced two young, had this year laid fourteen eggs; the first on the 11th of May, and then every second day one, until the 31st. A twelfth was laid on the 3rd of June, another on the 4th, and the fourteenth and last on the 5th. The female used to sit upon them for three hours daily, leaving to the male the onerous duty of sitting all the rest of the time. During a violent storm, however, which occurred on the 17th the female placed herself beside her mate, the better to protect the eggs from injury. The first bird made its appearance on the 23rd, and was soon followed by three more. A fifth broke its shell on the 24th, and a sixth two days later. The brood used regularly to pass the night under their parent's wing. There still remained eight eggs; but another storm having broken out on the 26th, the old birds became restless and quitted their nest, nor could they be prevailed upon to return to it. Five of these eggs were found to be in a fair way of being hatched, but the other three were addled. The two young ostriches hatched in 1859 were stated to be thriving, and to have already nearly attained the size of their parents. M. Geoffroy St. Hilaire took occasion to remark, after reading this communication, that from observations made at the Jardin des Plantes, where the cassowary of Australia had been reproduced, it was proved that it is the male and not the female that sits, just as in the case of ostriches. —*From the 'Field.'*

Capture of an Ashcoloured Shrike (Lanius Excubitor) *at Sea.*—I have just had sent me a specimen of the above bird which was taken in the rigging of a vessel on the 1st of this month, when about 60 miles from land. The ship was on her way from the Baltic to this country, and arrived at Fraserborough (a port on the N.E. coast of Scotland) two days afterwards. At Fraserborough the master of the vessel presented the bird, which was still alive, as a rarity to the chief officer of the Custom House. That gentleman had it put into a cage, and would have kept it, but it refused all sorts of food (*Query*, did it get the right sort?), and was otherwise so very wild that at last he had it killed, in order to preserve its plumage. It was then forwarded here for preservation, as also to see what sort of bird it was. I may add that on dissection it proved to be a male, and there is no doubt of its being an immature bird, that is a bird of the year.—*Thomas Edward; Banff, October* 8, 1860.

Capercally Breeding in Scotland, &c.—On the 26th of September, at the Birmingham Natural History Association, Mr. A. Franklin, taxidermist, exhibited a magnificent hybrid of the capercally (*Tetrao Urogallus*) and the black grouse (*Tetrao Tetrix*). It was shot this season in Perthshire, by a gentleman of our town, and placed in Mr. Franklin's hands for preservation. The leading characters of this bird are those of the capercally; the bill, however, is black. In 1852 a similar hybrid was shot in the same county. In 1857 a nest of nine eggs of the capercally was recorded in the 'Perthshire

Courier' as taken near Logielmond. Associating these facts, it seems evident an extirpation of the birds introduced by the Marquis of Breadalbane is not yet completely effected, and we hope may not be.—*George R. Twinn; The Elms, Birmingham, September* 29, 1860.

Occurrence of the Buffbreasted Sandpiper (Tringa rufescens) *near the Land's End.*—On the 8th instant Mr. Vingoe, naturalist, of this place, discovered, on some high moor ground near a pool, a very good specimen of this little sandpiper in apparently the first year's plumage. It exactly resembles in every respect the specimen which I gave you notice of, and which appeared in the 'Zoologist' some years since. That specimen was killed, I think, on the sea-shore near this place. It therefore appears that it does not confine itself to the tidal estuaries, but affects moorland marshes.—*Edward Hearle Rodd; Penzance, September* 26, 1860.

Occurrence of the Red Phalarope at Scilly.—On the 8th inst. a specimen of this small phalarope in adult winter plumage was observed swimming about in the freshwater lake at Trescow. It was shot after having been fired at and flushed on the wing several times, the bird showing, by its returning to the same spot, its characteristic tameness.—*Id.; October* 11, 1860.

Zoology of the Pratas Shoal, a Coral Reef in the China Sea.—During a survey of the dangerous reef of coral formation in the China Sea, named usually the Pratas Shoal (although not a shoal but a reef), I spent a day in exploring the natural productions of the little island which arises from the sunken portion of the great subcircular reef on the western side. It is a small island composed of coral and coral-sand, about a mile and a half long, and half a mile wide. It is covered with a dense scrub made up chiefly of Scariola lobelia. At the western end there is a salt-water lagoon running into it for nearly half a mile. The following enumeration of genera found on so small an island may be of use as illustrating the colonisation of coral islands.

LIST OF ANIMALS OBSERVED ON PRATAS ISLAND.

Mammals. Rat, mouse.

Birds. Hawk, swallow, kingfisher, thrush, wagtail (two species), butcher-bird, cuckoo, pigeon, plover (two species), godwit (*Limosa*), padi-bird (*Ardea*), curlew, snipe, sanderling (two species), gannet.

Reptiles. Turtle, lizard (*Zootoca*).

Amphibians. None.

Fishes. None on the island itself, except a species of Periophthalmus in the lagoon.

Mollusks. Succinea, Melanopus, Truncatella.

Insects. Coleoptera: Opatrum, Chilocoris, Microzæum, Cryptocephalus, Haltica, Dermestes (in dead gannets), Calandra, Brachelytra (two species). *Orthoptera:* Forficula, Blatta (two species), Mantis, Acheta, Gryllus, Locusta, Truxalis. *Neuroptera:* Libellula. *Hymenoptera:* Formica (three species), Andrena. *Lepidoptera:* Sesia (large species), a moth with white wings common on Scavida, Tinea (small species) on leaves. *Hemiptera:* two species of sand-bug and one shield-bug. *Diptera:* three or four kinds of flies.

Myriapods. Geophilus (under masses of Madrepore).

Arachnidans. Lycosa, Walckenaera, Gastracantha, Thomisus, Saltica (four species), Scorpio (common under dead stems and leaves).

Crustacea. Oxypoda (two species), Thelphusa (two species), Oniscus (two species).

Annelides. Lumbricus (under dead coral-masses on the shores of the lagoon).—*Arthur Adams.*

On the Probable Origin of some Sea Serpents.—An incident occurred on board the vessel of which I am surgeon which, I think, deserves to be recorded as an illustration of optical delusion that might have become a source of error, and given rise to yet another sea serpent. We were sailing among the Islands of the Miatan group, at the entrance of the Gulf of Pe-chili. There was little wind, and gentle ripples covered the surface of the sea. I was sipping my Congo at the open port of the ward room on the main deck, admiring the setting sun, and watching the rounded outlines of the blue mountains and distant islands against the sky, and the numbers of sea-birds "wheeling rockwards to their nests," when my eye rested on a long dark object apparently making its way steadily through the water. After observing it sometime in silence I was sorely puzzled and could make nothing of it. It was neither a seal nor a diver nor a fishing cormorant, for with their forms I was familiar; so I went on deck and consulted other eyes than mine. Sundry glasses were brought to bear on the suspicious object, and the general scrutiny seemed to decide that it was a large snake, about ten feet long (or much longer according to some), working its way vigorously against the tide by lateral undulations of the body. So strong was this conviction that the course of the ship was altered, and a boat got ready for lowering. With a couple of loaded revolvers, some boathooks and a fathom or so of lead-line, I made ready for the encounter, intending to range up alongside, shoot the reptile through the head, make him fast by a clove-hitch, and tow him on board in triumph! By this time, however, a closer and more critical inspection had taken place, and the supposed sea-monster turned himself into a long dark root, gnarled and twisted, of a tree, secured to the moorings of a fishing net, with the strong tide passing it rapidly, and thus giving it an apparent life-like movement and serpentine aspect.—*Arthur Adams; April* 27, 1860.

Singing Fish.—That part of the interesting letter from Dr. Buist, in the 'Athenæum,' relating to the voice of fishes, has induced me to send you this note. The River Plate swarms with fish, and is the habitat of one possessed of a very sonorous voice, like that found in the River Borneo—the account of which is quoted by Dr. Buist from the 'Journal' of the Samarang. During the years 1845-6 H.M.S. Eagle was stationed in the River Plate, and anchored about three miles from Monte Video, with an occasional change a little higher up the stream, or lower down, as far as Maldonado. During my service on board that ship I have often heard a loud piscatory chorus during the night. My cabin was in the after part of the gun-room; and when lying in bed with the "scuttle" open (a small window about six feet from the surface of the river) I have listened with pleasure and curiosity to the loud sounds proceeding from these creatures as they roamed in numbers round the ship. The noise they made was at times very loud and close at hand, and seemed to proceed from many voices—receding now and then, and becoming lost in the distance, and again returning. At other times, as far as I could judge, a solitary voice was heard, and then a few together. There was little variation in the sound, which was of a deep tone, more like the rumbling of a drum or organ than anything else. Nevertheless, whether it was fancy or not, there was something pleasing, and even musical, in the sounds as they became slowly or suddenly distant or near, with the retreat or approach of the band. I have no doubt that this drumming sound came from one of the Sciænoids, probably akin to the Pogonias; but the fish was never seen or caught near the ship where its voice was heard. Amongst the numerous varieties of fish brought on shore on hauling the seine at Maldonado Bay, several were occasionally caught resembling the Pogonias Chromis, varying in weight from 40 to 60 lbs.—*From the 'Athenæum.'*

Singing Fish.—On the broad expanse, or bay of the Tagus, which extends from Cacilhas-Point to Aldea-Gallega, I have heard proceed from the water (and apparently close under the boat), on several occasions, sounds resembling the vibrations of a deep-toned bell, gong or pedal-pipe of an organ. The boatmen seemed to know them well, and generally exclaimed "The Corvina!" This is a large fish with black fins, which is, I believe, to be met with occasionally in the Lisbon market.—*Id.*

The Mollusca of the Firth of Clyde. By the Rev. ALFRED MERLE NORMAN, M.A.

(Continued from p. 7213.)

Fam. XIV. *Naticidæ.*

Natica monilifera. Sandy beaches and bays; but not common.

*N. nitida (*Natica glaucina* and *N. Alderi*). Common; the specimens are mostly of small size.

N. sordida. This species is recorded by Forbes and Hanley as having been taken, by Mr. M'Andrew, "off Arran, in Scotland, in twenty-five fathoms." The specimens, which I have seen, I find were taken on the western side of Arran—that is, in Kilbrannan Sound, and not in the district under consideration. I have also myself procured the species in Loch Fyne, so that it will probably be hereafter met with in the Firth of Clyde.

N. Montagui. Common in the deeper parts of the laminarian and in the coralline zone among nullipore. The specimens mostly small.

Fam. XV. *Velutinidæ.*

*Velutina lævigata. A few specimens near the Tan Buoy, Cumbrae, and in Lamlash Bay. It appears scarce. Mr. Hennedy meets with it at Gowrock, *Naturalist*, vol. ii. p. 88, 1852.

Lamillaria perspicua (*Cariocella perspicua*). One living specimen from the large rock-pool at the Allans, Cumbrae. Dr. Landsborough recorded it from Lamlash.

L. tentaculata (*Sigaretus haliotoideus*). Clyde, *Smith*. Mr. Roger Hennedy, in a paper read before the Glasgow Natural History Society, mentions this species, among a few others, found at Gowrock, and says it "is found in May beneath stones, where it probably comes at that season to deposit its spawn."—*Naturalist*, vol. ii. p. 88.

Fam. XVI. *Cancillariadæ.*

Trichotropis borealis (*Fusus umbilicatus*). This interesting species, remarkable for the epidermal bristles with which it is adorned, occurs sparingly in the coralline zone throughout the district. Mr. Smith published the shell from the Clyde under the name of "Fusus umbilicatus," but the species had shortly before been described by Broderip and Sowerby.

*Cerethiopsis tubercularis (*Cerethium tuberculatum*). Alive in rock-pools at Allan and Cumbrae, and dead in shell-sand. I met with an unusually large specimen in a rock-pool at Clachland Point, which measured five lines long and one line and a half broad; it had fourteen whorls remaining, and at least three more had been broken off.

Fam. XVII. *Muricidæ.*

*Purpura lapillus. Clyde specimens are mostly white or yellowish white.

*Nassa reticulata (*Buccinum reticulatum*). Rare. I have taken two or three specimens, but they had a very unhealthy look, as though the locality did not suit them.

N. incrassata (*Nassa macula, Buccinum macula*). Common.

*Murex erinaceus. Bute, Ayr, *Smith*.

*Buccinum undatum (*Buccinum anglicanum* and *B. carinatum*). Common.

*Fusus antiquus. Not common in the district.

F. norvegicus. Bute, *Smith*. Was it fossil?

F. islandicus (*Fusus corneus*). I have taken two or three examples off the Tan Buoy; and it is more abundant in deep water off the north-east end of Little Cumbrae. "Near Fullerton's Rock in twenty fathoms," *Greville and Miles*.

*Trophon clathratus (*Fusus Bamfficus*). Clyde, Bute, *Smith*. Lamlash, *Landsborough*.

T. bervicensis. Included as a Lamlash shell in Dr. Landsborough's last corrected catalogue of the Mollusca of the Bay.

Fam. XVIII. *Conidæ.*

*Mangelia turricola (*Pleurotoma* and *Fusus turricolus*). Scarce in Lamlash Bay. Ayr, Bute, *Smith.*

M. rufa (*Fusus rufus*). Lamlash, *Landsborough. Var.* ulideana. "Between Fullarton's Rock and King's Cross Point; only one specimen obtained," *Greville and Miles.*

M. sepangularis (*Fusus septangularis, Pleurotoma septangularis*). Rare at Lamlash. Ayr, Bute, *Smith.*

M. teres. I have dredged one living example of this beautiful Mangelia on the bed of old rotten scallops described under Ptilidium fulvum. Messrs. Greville and Miles took three specimens in Lamlash Bay.

M. Trevelliana (*Pleurotoma sinuosa*). The Pleurotoma sinuosa is said by Mr. Smith to have occurred at Ayr.

M. purpurea (*Fusus purpureus, Pleurotoma purpurea*). A few specimens between Clachland Point and Holy Island. I once met with a dwarf form in some numbers in the large rock-pool of the outer Allans.

M. Lefroyi (*Fusus Boothii, Pleurotoma Boothii*). This species was first described as British from specimens taken by Mr. Smith and Professor Forbes in Lamlash Bay, Cumbrae. It is frequent in other parts of the Clyde, also among nullipore in the coralline zone.

M. linearis (*Fusus linearis, Pleurotoma linearis*). Not uncommon alive in Lamlash Bay, Cumbrae.

M. gracilis (*Fusus gracilis, Pleurotoma elegans*). "Clyde in fifteen to twenty fathoms," *M'Andrew.* Lamlash, *Landsborough.*

M. nebula (*Fusus nebulus*). Clyde, Bute, *Smith.* Lamlash, *Landsborough.*

M. striolata (*Pleurotoma Smithii*). Rare near Cumbrae. It has also been taken by Mr. Smith and Professor Forbes "in twenty fathoms," *Forbes and Hanley.*

*M. costata (*Fusus costatus, Pleurotoma costata, Pleurotoma coarctata*). Occasional in deep water.

M. attenuata (*Fusus attenuatus*). Inserted in Dr. Landsborough's lists, but probably in error. Mangelia striolata was probably mistaken for it, as that species does not occur in the lists, at pp. 160 and 363, of the 'Excursions' which give Fusus attenuatus.

Fam. XIX. *Cypræadæ.*

Cypræa europæa (*Bulla candida, B. diaphana*). Frequent.

Ovula acuminata (*Bulla acuminata*). Has been dredged in Lamlash Bay by Mr. Alder (*Forbes and Hanley*) and Dr. Landsborough.

Marginella lævis (*Marginella voluta*). Ayr, *Smith*.

Div. II. OPISTHOLBRANCHIATA.

Fam. XX. *Bullidæ*.

*Cylichna cylindracea (*Bulla cylindrica, B. cylindracea, Volvaria cylindrica*). Occasionally dredged near Cumbrae, and in Lamlash Bay. Bute, *Smith*.

C. truncata (*Bulla truncata, Volvaria truncata*). Abundant in rock-pools, apparently in all parts of the Clyde; and very common dead in shell-sand.

*C. obtusa (*Bulla obtusa*). Lamlash, *Landsborough*.

C. mamillata (*Bulla mamillata*). Frequent among shell-sand from Landsborough's Bay.

C. umbilicata (*Bulla umbilicata*). Rare, Lamlash Bay.

"To this genus belongs the Volvaria alba of Brown (Ill. Conch. G. B. p. 3, pl. 19, fig. 43, 44), said to have been found at Greenock, and usually supposed to be (as British) a fossil species."—*Forbes and Hanley*.

Amphisphyra hyalina (*Bulla hyalina, B. pellucida, Bullæa minuta*). Widely distributed throughout the district in rock-pools at spring tides.

Tornatella fasciata (*Tornatella tornatilis*). I have taken a specimen or two to the west of Cumbrae, and also in Lamlash Bay. Ayr, Bute, *Smith*.

Akera bullata (*Bulla akera*). Scarce in Lamlash Bay. Ayr, Bute, *Smith*.

Bulla Cranchii. I dredged a single very fine specimen of this shell in deep water outside of Lamlash Bay.

Scaphander lignarius (*Bulla lignaria*). Abundant in Kames Bay, and, in deeper water, about twenty-five fathoms off the Allans, Cumbrae; also at Lamlash. Ayr, *Smith*. At Whiting Bay, in Arran, it may be taken by "digging in the sand at ebb-tide," *Landsborough*.

Philene aperta (*Bullæa aperta*). Not common, and always small, Cumbrae and Arran. Ayr, *Smith*.

P. punctata (*Bullæa punctata*). Lamlash, *Landsborough*.

P. Catena (*Bullæa catenata, B. catenulifera*). Lamlash, *Landsborough*. I dredged a living example of either this or the last species off the Clerk Rock, Millport, but the specimen was unfortunately lost before it had been examined.

P. scabra (*Bullæa pectinata*). Rare; I have only met with it outside the northern entrance of Lamlash Bay.

Fam. XXI. *Aplysiadæ.*

Aplysia hybrida. Young specimens in rock-pools at Cumbrae.

Fam. XXII. *Pleurobranchidæ.*

Pleurobranchus Plumula. Maybole, *Smith.*

P. ——— ? "Holy Island, at low water, found four individuals under stones; probably they are Pleurobranchus membranaceus."—*Greville and Miles.* It is more likely that they were P. Plumula, the species recorded by Mr. Smith, and which was found in the Isle of Man by the late Professor Forbes. P. membranaceus is essentially a southern species.

Fam. XXIII. *Dorididæ.*

Doris tuberculata. Low water, Cumbrae, and at Lamlash.

D. flammea. I dredged a fine specimen in deep water to the west of Cumbrae. Rothesay Bay, *Alder.* Lamlash, *Landsborough.*

D. Johnstoni. Taken by Mr. Alder in Lamlash and Rothesay Bays.

D. planata. Found by Mr. Alder when dredging in company with Dr. Landsborough in Lamlash Bay; it has not again been met with.

D. aspera. Rothesay, *Alder.*

D. bilamellata. Lamlash Bay, *Landsborough.* "Found under stones at low water on Holy Island."—*Greville and Miles.* I have also met with it at Cumbrae.

Goniodoris nodosa. "Ardrossan; plentiful near the Inch."—*Alder in litt.* "One example on Holy Island."—*Greville and Miles.*

G. castanea. "Saltcoats, Mr. D. Landsborough, jun."—*Alder and Hancock.*

Triopa claviger. Common in the large rock-pool of the outer Allans, and other parts of Cumbrae; also at Lamlash.

Ægirus punctilucens. "Ardrossan and Isle of Man, Mr. Alder."—*Alder and Hancock.*

Polycera quadrilineata. Lamlash, *Greville and Miles.* Cumbrae Island, Rev. D. Landsborough, *Alder and Hancock.* I have frequently dredged it in the same locality.

P. ocellata. Lamlash, *Landsborough.*

Fam. XXIV. *Tritoniadæ.*

Tritonia plebeia. Rothesay Bay, *Alder and Hancock.*

Fam. XXV. *Æolididæ.*

Lomonotus flavidus. "We obtained the only known example of this species on a small Antennularia brought up by the dredge in from three to four fathoms water in Lamlash Bay."—*Alder and Hancock.*

Lomonotus ——— ? Messrs. Greville and Miles dredged a Lomonotus "in Brodick Bay, between Invercloy and the Corriegills, in from ten to fifteen fathoms." From the description sent by them to Mr. Alder, he considered it probably new, but the specimen was unfortunately lost before any account of it was drawn up. The example was two inches in length, "white with orange processes," and differed from L. flavidus in the "length of the velafilaments, and the expansion of the posterior extremity."

Dendronotus arborescens. Lamlash, *Landsborough.*

Doto coronata. Lamlash, *Landsborough;* and I have dredged it to the west of Cumbrae.

D. fragilis. Cumbrae and Arran.

Æolis papillosa. Lamlash, *Alder.*

Æ. coronata. Common under stones at low-water at Cumbrae and Arran; and Mr. Alder has taken it at Rothesay.

Æ. Drummondii. In similar situations to the last, and equally common.

Æ. rufibranchiata. Lamlash, Rev. D. Landsborough, *Alder and Hancock.*

Æ. lineata. Saltcoats, Rev. D. Landsborough, *Alder & Hancock.*

Æ. smaragdina. An Æolis which I procured at Cumbrae came nearer to the description and figures of this species than any other in Alder and Hancock's work. It, however, differed in certain particulars, which I cannot now recall to mind.

Æ. Landsburgi. I have taken this lovely species at Cumbrae. It was first met with by Mr. Landsborough, jun., at Saltcoats.

Æ. alba. Rothesay Bay, *Alder and Hancock.* Lamlash, *Landsborough.* Isle of Cumbrae.

Æ. olivacea. Rothesay Bay, *Alder and Hancock.* Lamlash, *Landsborough.*

Æ. aurantiaca. Taken by Mr. Alder at Ardrossan, *Alder and Hancock.*

Æ. glottensis. "We procured a single specimen of this Æolis in June, 1846, while dredging in company with our friends, the Rev. Dr. Landsborough and his son, in Lamlash Bay, Isle of Arran."—*Alder and Hancock.* "Glotta" is the Latin name for Arran.

Æ. viridis. "At low-water mark, Saltcoats and Portincross, Ayrshire, Rev. D. Landsborough, jun."—*Alder and Hancock.*

Æ. amethystina. Lamlash, *Landsborough.*

Embletonia pulchra. Rothesay Bay, Alder; Saltcoats, Rev. D. Landsborough, *Alder and Hancock.*

Runcina Hancocki. Rock-pools, Farland Point, Cumbrae, in company with the Limapontia.

Fam. XXVI. *Elysiadæ.*

Elysia viridis. Common in rock-pools in all parts of the coast that I have examined.

Fam. XXVII. *Limapontiadæ.*

Limapontia nigra. Abundant in rock-pools at Farland Point, Isle of Cumbrae.

Div. III. PULMONIFERA.

Fam. *Auriculidæ.*

Conovulus denticulatus (*Voluta denticulata*). This species is inserted in Mr. Smith's catalogue without locality. It may therefore only have been found by him in the north east of Ireland, whence I have received specimens.

C. bidentatus (*Voluta bidentata*). I have procured a few examples from shell-sand dredged in Lamlash Bay. Mr. Smith also records it from Bute.

Class V. CEPHALOPODA.

Div. DIBRANCHIATA.

Fam. I. *Octopodidæ.*

Eledone cirrhosus (*Octopus octopodia, Eledone octopodes*). Ayr, *Smith.* Lamlash, *Landsborough.*

Fam. II. *Teuthidæ.*

Loligo media. Maybole, *Smith.*

Fam. III. *Sepiadæ.*

Sepia officinalis. Ayr, *Smith.*

Addenda.

Molgula ———? I dredged a species, which may perhaps be M. rustica, in great abundance in 1857, between Clachland Point and the Corriegills. It occurred in deep water. Further observation is required to identify the species.

Pholas candida. In "An Account of a Day's Excursion to Bute, by James P. Fraser, Esq.," a short paper published in the 'Naturalist' (vol. i. 1851, p. 127), I find the following reference to this shell as occurring at Rothesay:—"The state of the tide precluded our getting at the ground where Pholas candida is very abundant; but we were not much too late, for one of our party, who in his enthusiasm had rushed into the water, said he was standing on the bank which contained them." Mr. Fraser does not appear to have procured specimens, and an error may have been made with respect to the species.

Lyonsia norvegica. "Between Holy Island and Clachland Point." —*Greville and Miles.*

Tapes pullastra. "Holy Island, &c."—*Greville and Miles.*

The following names occur in Mr. Smith's 'Catalogue,' which I find it impossible to recognise as synonyms of our admitted species:— Tellemya ovata, *Brown*, perhaps a form of Kellia suborbicularis; Amphidesma ovale; Tellina punicea, exotic; Crassina depressa, fossil? (*vide* Forbes and Hanley, vol. i. p. 471); Venus sulcata, exotic (*vide* Forbes and Hanley, vol. i. p. 470); Cardium medium, exotic?; Lima sinuosa, synonym of Lima hians?; Pecten medius; Turbo olivaceus; Pyramis pallidula; Cerethium elegans, exotic.

The following in 'Landsborough's Excursion' present similar difficulties:—Crania spiralis; Cardium medium; Turritella ambigua; Helix bicolor, probably one of the Skeneæ; Cerethium elegans; Rissoa scalariformis.

Of the Mollusca referred to in this Catalogue the following seventeen may safely be considered to have been erroneously recorded as denizens of the Clyde:—

Panopæa norvegica
Venus verrucosa
Astarte arctica
Cardium aculeatum
Leda oblonga
„ truncata

Pecten islandicus
Trochus exiguus
„ crassus
Ianthina communis.
Rissoa abyssicola
Chemnitzia clathrata

- Chemnitzia eximia
- Truncatella Montagui
- Natica sordida
- Fusus norvegicus
- Mangelia attenuata

The right of the seventeen species in the next list (and perhaps one or two others also) to be admitted may also be questioned, and their retention must be dependant on the results of future investigation.

- Pholas candida
- Thracia pubescens
- Solen marginatus
- Syndosmya tenuis
- Pecten niveus
- Trochus Alabastrum
- Rissoa costulata
- „ semistriata
- „ rubra
- Rissoa vitrea
- Odostomia plicata
- Murex Erinaceus
- Mangelia Treveliana
- Marginella lævis
- Pleurobranchus membranaceus.
- Æolis smaragdina
- Conovulus denticulatus

It must be borne in mind that the difficulties which a naturalist had to contend with before the publication of 'The British Mollusca' were very great, and errors in nomenclature consequently frequent, even in the best cabinets; and this was especially the case with respect to the more critical and minute species. The exotic shells—unless the errors consisted in nomenclature—and the South British forms may have been transported to the Clyde in ballast, a most prolific source of aliens in years gone by, while five of the species formerly admitted were post-tertiary fossils.

Excluding the thirty-four above-mentioned species from the list, the number of Mollusca inhabiting the Firth of Clyde will be found to be three hundred and five.

The "Clyde Province" may be divided into three subprovinces:— 1. The Firth of Clyde; 2. Loch Fyne (including Kilbrannan Sound); 3. The North Channel. The first of these subprovinces forms the subject of the present paper. Subjoined are lists of the Mollusca which have been met with in the last two subprovinces, but which have not as yet been noticed in the Firth of Clyde.

LOCH FYNE.

- Cynthia quadrangularis
- *Neæra costellata
- * „ abbreviata
- Pandora obtusa
- Tellina proxima (fossil)
- *Syndosmya intermedia
- *Lucina ferruginosa
- Nucula decussata

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* These species have been met with by myself; the rest are inserted on the authorities given by Forbes and Hanley.

*Pecten furtivus (*Loven*)
Scissurella crispata
*Rissoa zetlandica
* „ sculpta
„ crenulata
* „ abyssicola
Eulima bilineata
*Chemnitzia fulvocincta
Odostomia acuta

Odostomia insculpta
*Eulimella Scillæ
„ acicula
„ affinis
*Natica sordida
Velutina flexilis
Cylichna nitidula
„ strigella
Philene pruinosa

THE NORTH CHANNEL.[a]

Sidnyum turbinatum
Amouroncium proliferum
Leptoclinum maculosum
„ asperum
Distoma rubrum
Botryllus polycyclus
„ gemmeus
„ smaragdus
„ bivittatus
Ascidia scabra
„ aspersa
„ conchilega
Cynthia claudicans
Teredo nana
„ cucullata (*Norman*)
„ fimbriata (*Jeffreys*)
Pholas parva
„ candida
Pholadidea papyracea
Solecurtus candidus
Modiola Tulipa
Pecten furtivus (*Loven*)
†Terebratula capsula (*Jeffreys*)
Argiope cistellula
Chiton albus
„ Hanleyi
„ cancellatus

Trochus striatus
„ cinerea (*Gould*)
†Phasianella pullus
Ianthina communis
†Lacuna crassior
„ labiosa (*Loven*)
Littorina fabalis
†Rissoa crenulata
† „ Calathus
Cerethium niveum (*Jeffreys*)
Chemnitzia scalaris
„ rufa
†Eulima bilineata
Odostomia alba
„ conspicua
„ truncatula
„ Gulsonæ
Natica helicoides
† „ clausa (*Brod. and Sow.*)
Cerethiopsis pulchella (*Jeffreys*)
†Murex Erinaceus
Nassa pygmæa
†Astyris Holböllii (*Müller*)
†Trophon clathratus
† „ scalariformis (*Gould*)
Mangelia Treveliana
„ reticulata (*Philippi*)

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[a] The waters of the coast of Antrim extending northward to the Mull of Cantire and Arran.

† The species thus marked are in my own collection. The Tunicata and Cephalopoda are on the authority of Mr. W. Thompson. The testaceous forms are chiefly extracted from Mr. Jeffrey's recent "Gleanings" in the 'Annals of Natural History.' A few also together with the Nudibranchs from Forbes and Hanley. For Odostomia conspicua and Ovula patula see 'Natural History Review,' vol. vi. "Proceedings of Societies," pages 79 and 85.

Ovula patula
Cylichna Lajonkaireana (*Bast.*)
„ nitidula
Philene quadrata
Doris ulideana
Æolis tricolor
Hermæa bifida
Conovulus albus
Sepiola atlantica
Rossia macrosoma ?
Loligo vulgaris
Ommastrephes Eblanæ
Spirula Peronii

I am of opinion that the Arctic Mollusca (*Natica clausa, Astyris Holböllii, Lacuna labiosa, Trophon scalariformis,* &c.), which have recently been dredged on the Turbot Bank off Larne, and have created so much interest, must be regarded as fossil. Although the shells are in a beautiful state of preservation, they show symptoms of having been washed to their present site from a matrix of red shelly marl. In some specimens the marl may be found still within the mouth ; in almost all, signs of it may be seen in the red stains of the suture. Even as fossil they are highly interesting, as indicating a bed different in character from any yet discovered ; but shown by the character of the shells found to belong to the glacial period.

If the Mollusca met with in Loch Fyne and the North Channel be added to those of the Firth of Clyde, the number of species hitherto taken in the whole " Clyde Province " amounts to three hundred and ninety-four.

Several of the rarest species of the Firth of Clyde are much more abundant in the other subprovinces.

There can be little doubt that there are several species yet to be discovered in the Firth of Clyde, and probably careful dredging in the mid-channel between Arran and Ayrshire would be rewarded by the finding of some of the deep-water Loch Fyne forms.

ALFRED MERLE NORMAN.

Sedgefield, Ferry Hill,
October 9, 1860.

Errata.—Page 5876, line 34, for " Veniorupis " read " Venerupis " Page 5877, line 12, for " striata " read " striatula " Page 5878, line 12, for " Bay ;" read " Bay." Page 5882, line 28 and line 32, for " trians " read " hians " Page 5884, line 13, dele " coast " Page 7203, line 26, for " B. lævis " read " C. lævis " Page 7204, line 5, for " skin " read " spire " Page 7207, line 28, for " common ;" read " common." Page 7208, line 14, for " Eulenia distorta " read " Eulima distorta " Page 7209, line 11, for "Lamlash ;" read " Lamlash." Page 7210, line 22, for " had " read " have " Page 7211, line 12, for " elathrus " read " clathrus " Page 7211, line 19, for "Adis" read "Aclis" Page 7212, line 25, for " Halichondria favinaria " read " Halichondria farinaria " Page 7212, line 31, for " Lover " read " Loven "—*A. M. N.*

Reported Occurrence of Lycæna Acis in Epping Forest.—I am happy to inform you that I captured a specimen of Lycæna Acis last Friday, August 31, in Epping Forest. Although slightly damaged it is in other respects a very fair specimen. As Mr. Newman, in his excellent "Butterfly Number of Young England," says the species is not now obtained, this announcement may be interesting to some of my young friends.—*W. Banks; 5, George's Terrace, Copenhagen Street, Islington, September* 3, 1860.—'*Young England.*'

[Will Mr. Banks oblige me by bringing the specimen to this office to have this interesting statement verified?—*Edward Newman.*]

Pupæ of Sphinx Convolvuli.—A considerable number of the pupæ of Sphinx Convolvuli have again been dug up in the potato fields in the South of England; and I am indebted to Mr. Bond for a very fine specimen for the cabinet of the Entomological Club. Entomologists finding these pupæ in potato fields are earnestly requested to observe whether the Convolvulus arvensis or any other plant is growing among the potatoes.—*Edward Newman.*

Capture of Chœrocampa Celerio at Darlington.—I have a fine specimen of this insect, which was taken here on Sunday last, off a window-ledge, by a friend of mine, and was given to me.—*W. Beadnell; Northgate, Darlington.*—'*Intelligencer.*'

Capture of Chœrocampa Celerio at Matlock.—A fine specimen of this insect was taken at Matlock, on the 20th ult., by a gentleman, at whose house I saw it last week. It was fluttering in the long grass and herbage beneath a clump of fir trees, about six o'clock in the evening, having evidently just emerged from the pupa state. My friend put his hat over it, but having no net or box at hand he was obliged to grasp it rather roughly with his fingers, nip it beneath the wings, and pin it with a lady's common shawl-pin.—*F. Tearle; Grammar School, Kettering, October* 5, 1860.—*Id.*

Capture of Chœrocampa Celerio at Nottingham.—On Saturday evening last a party of workmen brought a large moth to the Museum of the Natural History Society for identification. Their capture was eagerly compared with the occupants of the case, and, to the evident delight of its owners, found to tally exactly with Chœrocampa Celerio, with the exception that it had "no horns." It had been taken in a factory in the town, into which, from the partiality of its species for light, it had no doubt been attracted by the glare of what the Lancashire operatives term "the manufacturer's sun," too close contact with which had probably deprived it of its antennæ. —*September* 24, 1860.—*Id.*

Capture of Chœrocampa Celerio at Wakefield.—At the meeting of our Naturalists' Society on Thursday last, a splendid living specimen of Chœrocampa Celerio, as if just emerged from the pupa, was exhibited by Mr. Talbot. It was in excellent condition, and did not appear to have made use of its wings.—*H. S. Roxby; Wakefield, October* 1, 1860.—*Id.*

Capture of Sphinx Celerio at Beccles.—I saw a beautiful specimen of Sphinx Celerio in the shop of Mr. Steel, chemist, of Beccles: it entered the shop, attracted by the light, and settled on a door.—*W. Winter; Aldeby, October* 15, 1860.—*Id.*

Occurrence of Sesia Spheciformis in Sussex.—A friend of mine having taken an extremely fine female of Sesia Spheciformis in Sussex, was kind enough to conduct me to the locality, where I had the good fortune to secure a second specimen, also a female, as it was flying lazily over the fern: the date was the middle of July, probably a month later than usual, owing to the backwardness of the season.—*Frederick Bond; 24, Cavendish Road, October* 19, 1860.

Description of the Larva of Rumia cratægata.—Rests in nearly a straight posture, the head slightly bent downwards. Head small, slightly notched on the crown, curiously impressed on the face, the impression being double—that is, a small triangular depression within a larger and vaguer one: a large erect nipple-shaped hump, like a horn, on the back of the 7th segment; two small distant warts on the back of the 8th, and two rather larger ones on the back of the 9th; two abortive claspers beneath the 8th segment, and two small but still useable claspers beneath the 9th; a fringe of fleshy tubercles on each side between the 10th and 13th segments; these seem appressed to the twig when the larva is at rest. Colour very inconstant, varying from green to brown, but generally opaque brown. Feeds on Cratægus oxyacantha (whitethorn). There appear to be two broods of this insect; I have had the larva full fed in June, September and October.—*Edward Newman.*

Description of the Larva of Eurymene dolobraria.—Head divided into two obvious portions, indented on the crown, but not bifid: body with the 3rd segment evidently incrassated or tumid; the 9th with a transverse dorsal swelling; there are no other warts or excrescences either on the back or belly. Colour dark sombre brown, with two distant white dots on the back of the 4th, 5th, 6th, 7th, 8th and 10th segments; spiracles black, but the region around the spiracles rather paler, indistinctly mottled with gray. Feeds on Betula alba (birch); full fed on the 2nd of October; draws the leaves of the food-plant together, and changes to a pupa in the interior; remains a pupa all the winter. I am indebted to Mr. Thomas Huckett for this larva, as well as for the three which follow.—*Id.*

Description of the Larva of Selenia illunaria.—Head porrected, body when at rest bent back at the 4th segment; the 3rd segment rather tumid at the sides; the 4th rather tumid beneath, the 3rd pair of legs being seated in the swelling; 8th and 9th segments have each a pair of acute, approximate humps on the back. Body bright rust-coloured, but neither uniform in tint as regards a number of individuals, nor of uniform colour in the same individual, there being numerous shades and tints too various and too inconstant to describe; on the back of the 6th segment are two very distinct yellow spots. Feeds on Betula alba (birch), and is double-brooded; the second brood is full fed at the end of September; it spins a slight cocoon among the leaves, and remains in the pupa state all the winter.—*Id.*

Description of the Larva of Selenia lunaria.—Rests in a curved posture and oscillates the anterior part of the body when disturbed. Head not perceptibly notched; body singularly humped; 3rd segment tumid, having on each side a large subdorsal hump; 4th segment rather tumid below, the legs on the swollen portion; 6th segment with a large transverse dorsal hump, and a smaller obtuse lateral hump on each side; 7th segment with two dorsal warts and a large lateral hump on each side; 8th with two dorsal warts; 9th with a large dorsal hump, having a double indentation on its summit; 12th with two approximate small dorsal warts: colour green, gray or brown, with scarcely any variety of shading. Feeds on Quercus Robur (oak); full fed in Sept.; spins a few leaves together, and remains in the pupa state throughout the winter.—*Id.*

Description of the Larva of Selenia illustraria.—Head porrected; body when at rest bent back at the 4th segment, which is rather tumid beneath, the third pair of legs being seated on the swelling; the back is bowed and the figure altogether very singular; the 5th and 6th segments have each two small humps on the back; the 8th and 9th have each four small humps ranged in a transverse linear series; the 12th segment is full and square on the back, but not humped. The colour of this larva is rich purple-brown, varied with beautiful tints of orange-brown and pearly gray, reminding one very forcibly of the exquisite colouring of the perfect insect. Commonly found feeding on Betula alba (birch), but eats the leaves of other trees, and in captivity feeds voraciously on Salix capræa (sallow): it is double-brooded, the first brood of larvæ being full fed on the 5th of July, the second at the end of September; it fastens together the leaves of its food-plant by a few silken threads, and changes to a pupa in the cot thus produced. See a description of this larva by Mr. G. F. Mathew, at page 6789 of the 'Zoologist.'—*Edward Newman.*

Capture of Dosithea eburnata near Conway.—Having taken one of the above insect on the last day of July, 1856, near Conway, I have visited the locality every year since—last year three times, and three times this year—and found one sitting on the wall on Bangor New Road, about half-way between Conway and the large rock that projects out into the Irish Sea, opposite Puffin Island. My old friend Mr. Gregson was with me when I found it; this was on the 8th of August, 1860.—*Thomas Hague; "Dog and Partridge," Staleybridge, September* 24, 1860.—'*Intelligencer.*'

Description of the Larva of Acidalia scutulata.—Long, slender and tapering towards the head. Ground-colour pale drab, yellowish on the anterior and posterior segments. Central dorsal line very distinct, dark brown, ceasing on the post-capital segment; on either side of the latter the rudiments of a dusky subdorsal line. Back and sides marbled with indistinct slanting lines and dusky spots. Spiracular line whitish; subspiracular line dusky, waved. Belly dusky, with numerous dark wavy lines and a horizontal chain of dusky oval spots. Body sparingly strewed with short hairs. Taken in October, on flowers of Pimpinella Saxifraga; hybernated and fed-up in April, on flowers of Anthriscus sylvestris.—*H. Harpur Crewe; The Rectory, Drayton-Beauchamp, Herts, October* 17, 1860.

Occurrence of Eupithecia helveticata in Buckinghamshire.—About a month since Mr. Wilson kindly sent me a few larvæ of E. helveticata from Scotland. As their food-plant, Juniperus communis, grows wild upon some of our chalk-hills, I thought there was no just cause or impediment why the larva should not occur here as well as on the other side of the Tweed; so I donned my stick and umbrella, and went out for an hour's thrashing. I am happy to say that my labours were crowned with success. I brought home five larvæ. I have been out several times since, and have each time taken a few more. I have little doubt that wherever the juniper grows wild this insect occurs.—*Id.*

Description of the Larva of Eupithecia abbreviata.—Slender, hairy, tapering towards the head. Ground-colour pale yellowish red. Central dorsal line pale olive. Down the centre of the back a series of pale olive V-shaped spots, sometimes bordered with yellow. Spiracular line yellowish. Segmental divisions red. Central ventral line yellowish, sometimes altogether wanting. Dorsal spots frequently merged in a broad central line. The whole of the markings on this larva vary much in intensity of colouring, but are usually faint and indistinct. Feeds on oak. Full-fed the beginning of July. Pupa enclosed in a slight earthen cocoon; bright red; thorax and wing-cases paler than abdomen; base of wing-cases dusky; abdominal divisions and tip deep red. Perfect insect appears the end of April and in May.—*Id.*

Note on the Pupation of Eupithecia tenuiata.—The larva of this insect, when full fed, comes out of the sallow catkins, and spins a slight cocoon among earth, roots of grass or moss. The pupa is pale golden yellow. Abdominal divisions dusky. Thorax and wing-cases having a slight greenish tinge. Eyes prominent, blackish. Abdomen short and curtailed.—*H. Harpur Crewe.*

Description of the Larva of Cidaria pyraliata.—Long, slender and tapering towards the head. Ground-colour grass-green. Central dorsal line broad, dark green, bordered on either side by a pale yellow line. Segmental divisions yellow. Central ventral line yellow. These larvæ were hatched in March, from dark yellow eggs laid the previous August. They fed till the last month on Galium Mollugo, afterwards on G. aparine. Full-fed the second week in May. The pupa, which was enclosed in a slight cocoon among leaves, was pale drab, resembling in colour the pupa of Ennomos angularia or E. erosaria.—*Id.*

Description of the Larva of Melanippe hastata.—Head of moderate size: body, when at rest, almost straight; the head not tucked in, and hence the anterior part of the body not involute; 2nd segment covered with a shining plate; the other segments regularly transversely wrinkled, and of a texture like leather; the 10th segment is rather the largest, and from that the larva tapers slightly to both extremities. Head black and shining: body generally black, but sometimes rich black-brown: on each side is a continuous series of minute white dots, which form a slender lateral stripe along all the segments except the 2nd and 13th; this stripe is above the spiracles: the spiracles are black, and each is enclosed in a white spot, and below each white spot is a crescentic white marking, the convexity of which is towards the belly, the cusps towards the back; above the slender lateral stripe already described there is sometimes an interrupted subdorsal stripe: all these markings vary occasionally from white to brick-dust red. Feeds on Betula alba (birch) and Myrica Gale (sweet gale). The economy, habit, structure and distribution of colour in the larva of Melanippe hastata are entirely different from those of any other of the genus; it spins together the leaves of its food-plant, and feeds from the inside of the chamber thus formed, sometimes eating through the substance of the leaf, at others eating only the upper surface; it is full feed on the 27th of August, and soon afterwards becomes a pupa, in which state it passes the winter. I am indebted to the Rev. J. Hellins for the free use of his valuable notes in describing the larvæ of the genus Melanippe, and also of a series of most exquisite coloured drawings of each species by Mr. Buckler.—*E. Newman.*

Description of the Larva of Melanippe tristata.—Cylindrical, slightly attenuated in front, rests in nearly a straight posture, but when disturbed tucks in its head, and the anterior part of the body is then slightly involute. Head brown, dotted with black: body brown, with a dark, nearly black, narrow median stripe; on each side of this are two white dots on each segment; and on each side of the body are two narrow, pale, slightly undulating, stripes, the lower of which is immediately above the spiracles; these two stripes are most delicately margined with black. This larva is extremely constant in colour. Feeds on Galium Mollugo (the great hedge bedstraw), and is full fed on the 1st of August: it spins a slight cocoon on the surface of the earth, and remains in the pupa state throughout the winter.—*Id.*

Description of the Larva of Melanippe procellata.—Cylindrical and elongate; rests in nearly a straight posture, which it retains when disturbed. Head rather small, brown, dotted with black, and having two divaricating darker stripes, nearest together on the crown and most distant at the mouth: body wainscot-brown, lighter from the 10th to the 13th segments, both inclusive; there is a median varied stripe on the back, commencing indistinctly on the 3rd segment, and dilating into a conspicuous dark blotch at the commencement of the 6th, 7th, 8th and 9th segments; before and after each of these blotches the median stripe assumes a reddish hue, and again assumes a deep black immediately after the red; on each side of this varied median stripe is a paler stripe, also very slender, and beyond these are three smoke-coloured stripes, rather diffuse and ill-defined; the first of these on each side passes into the head, and terminates on each side the mouth, as already described: on the back of each segment are two or four black dots: the 6th, 7th, 8th and 9th segments are slightly darker than the rest; the spiracles are black. Feeds on Clematis Vitalba (the traveller's joy), and is full fed on the 16th September; spins a slight web, and remains in the pupa state throughout the winter.—*Edward Newman.*

Description of the Larva of Melanippe unangulata.—Body stout, rather attenuated at both ends, rests with the head tucked in, the anterior part of the body, when disturbed, being curled in, or curved in the manner of the Ionic volute. Head brown, beautifully dotted and marked with black: body smoky brown, delicately mottled and varied; the back may be said to have seven smoke-coloured stripes, alternating with paler stripes: the median stripe is not perceptible on either the 2nd or 13th segment, but is distinct and uninterrupted on the 3rd and 4th segments; on the 5th, 6th, 7th and 8th segments it is suddenly dilated anteriorly, and more gradually posteriorly, and is extremely attenuated and scarcely perceptible on the remaining segments; on each of the interstices between the segments, commencing between the 4th and 5th, is a short transverse reddish band, terminated at each extremity by a longitudinal black spot; the remaining smoke-coloured stripes, three in number on each side of the median stripe, are scarcely susceptible of verbal definition: each segment of the belly after the 4th has a cluster of black dots which are not present in any other British species of the genus, but Mr. Hellins informs me that markings of the same colour and character occur in Cidaria picata. Feeds on Alsine media (chickweed), and is full-fed on the 1st of August; spins its cocoon on or just under the surface of the earth, and remains in the chrysalis state all the winter. In captivity it is sometimes double-brooded, but not in a state of nature. Mr. Hellins observes that the published descriptions of the perfect insect, being drawn from captured or faded specimens, do not mention the lovely purplish red tint which pervades the dark markings of the wings and body while the moth is fresh from the pupa-case, but which cannot be shown in the cabinet, as in a few weeks it seems totally to vanish.—*Id.*

Description of the Larva of Melanippe rivata.—Head of nearly the same diameter as the body, which is uniformly cylindrical: rests generally in a slightly bent posture, but when disturbed tucks in the head, thus giving to the anterior portion of the body the figure of the Ionic volute. Head dusky brown, with two darker brown lines meeting on the crown: colour of the body red-brown or dingy brown, beautifully variegated and mottled; the 2nd and 3rd segments have a median black line, and on each side of this is a direct white line, which extends into the 4th segment; on each of four succeeding segments is a somewhat horse-shoe-shaped median white mark; these marks might be called lozenge-shaped, but they are open at the posterior extremity; on the 10th segment, and extending thence to the extreme tip of the 13th, is a broad median dark brown stripe, and, separated from this by a space equal to its own diameter, is a white stripe of corresponding length, terminated at its anterior extremity by a somewhat comma-shaped jet-black mark, which has a white dot in the head of the comma; on each side of the median markings is a series of white dots; the 3rd and 4th segments have two dots each, the 5th, 6th, 7th and 8th have four each; the 9th and following ones have two each; there are several indistinct stripes and dots on each side of the body. Feeds on Galium Mollugo (the great hedge bedstraw), and is full fed on the 22nd July, when it spins a cocoon on the surface of the earth. This species sometimes becomes double-brooded in captivity, but not in a state of nature.—*Edward Newman.*

Description of the Larva of Melanippe subtristata.—Head of nearly the same diameter as the body, which is uniformly cylindrical; rests generally in a nearly straight posture, but when disturbed tucks in its head very tightly, thus giving to the anterior portion of the body the figure of the Ionic volute. Head pellucid, smoky brown dotted with black, and having two darker brown lines which meet on the crown: body brown, beautifully variegated and mottled; the 2nd, 3rd and 4th segments have a median black line, and on each of the six succeeding segments is a somewhat horseshoe-shaped median white mark, the last of which terminates in a median brown stripe, which extends through the 11th and 12th segments, and to the extreme tip of the 13th; these marks might be called lozenge-shaped, but they are open at the posterior extremity; the enclosed space in each is brick-red, with a median transverse black bar; there are two or four white dots on the back of each segment, and numerous waved markings of different shapes on the sides. Feeds on Galium Mollugo (the great hedge bedstraw), and is full-fed on the 30th June, when it spins a slight cocoon on the earth, and changes to a pupa. This species is double-brooded both in a state of nature and in captivity. The question whether the two species of Melanippe, rivata and subtristata, are identical or distinct, is one which has often occupied the attention of our most acute lepidopterists; I confess myself unable to appreciate the reasons that have been assigned for considering them identical, and have therefore always kept them separate: this opinion, however, has been formed almost entirely on superficial grounds, and without that minute attention to distinctive characters on which alone such a conclusion should be grounded. It is therefore with extreme pleasure that I now cite from the memoranda of Mr. Hellins the following excellent observations:—"Between the larvæ of Melanippe rivata and M. subtristata there is at first sight as great a similarity as exists between the same insects in the perfect state: the ground-colour of both is the same, varying from a pale fawn-colour through a greenish brown to a dull green, and even sometimes to a bright green, the lines and borders of the markings being of a deeper tint of the ground-colour, and often tinged with a good deal of red; in both, the segmental divisions are light red, though this indeed may be observed in a very great number of gray and brown larvæ, and in both the dorsal markings are of the same shape, namely, dark longitudinal lines bordered with light on the front and hind segments, and on the intermediate ones blunt white arrow-heads,* pointing forwards and placed at the segmental divisions, the white being clearest and brightest at the point, enclosing a diamond-shaped spot of a dark tint of the ground-colour, which at its hinder end runs indistinctly into the broken dorsal line, and themselves enclosed, on the front edge, by a dark suffused V-shaped mark, the apex of which runs into the dorsal line, and the sides appear to reach down to the spiracles, but become indistinct when examined with a lens. So far these species are alike, but a careful examination of a number of specimens during the past two or three

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* Perhaps lozenges would be a better word, but the other was chosen on account of the opening of the hinder end, which seems to admit the shaft of the arrow.—*J. H.*

years has led to the conclusion that they differ as follows:—The larva of M. rivata, as might be expected from the relative size of the two perfect insects, is invariably the larger; it is also more delicately tinted, and has the lines better defined; its dorsal arrow-heads moreover are but four in number, being placed on the divisions between segments 5 and 9; the seeming arrow-head between segments 4 and 5 on examination with a lens shows no white, and barely an interruption of the dorsal line; and the dorsal line which recommences between segments 9 and 10 is not preceded by any clear white: in M. subtristata the whole back is generally more clouded, the subdorsal lines which form the boundaries of the white arrow-heads not being defined; the arrow-head mark between segments 4 and 5, in M. subtristata, when examined with a lens, becomes quite distinct, and though not so perfectly formed as the four others that follow it, is yet quite plain and complete; between segments 9 and 10 also there is a well-defined half arrow-head, the hinder part of which runs into the lines on the hind segments, the entire number of arrow-heads being thus five and a half instead of only four. The difficulty of obtaining both species in the same stage, at the same time, no doubt renders this comparison less perfect than it might be could they be placed side by side; but the first or June brood of larvæ of M. subtristata are all gone down before the single brood of M. rivata have assumed the characteristic markings; and these again are gone down before the August and September larvæ of M. subtristata are available for comparison. It is well to mention that among some hundreds of the perfect insects of both species, which have been bred by four or five different entomologists during the last three years, there have occurred no intermediate varieties whatever: M. rivata varies indeed in having the gray border of the hind margin of its wings sometimes tinged with blue, sometimes with brown, but the white lines always preserve their distinctive width, and the under side is always lighter than in M. subtristata: of M. subtristata the only variety that has been observed was one which, far from having the white lines broader than usual, had the dark bands wider: of course worn specimens, which, having lost many of their scales, approach M. rivata in paleness, are not worthy of notice."—*Edward Newman.*

Description of the Larva of Melanippe montanata.— Nearly uniformly cylindrical; rests in a nearly straight position, but tucks the head in very tightly when disturbed, the anterior part of the body then assuming the form of the Ionic volute. Head pale brown, with numerous black lines: body pale brown, with a number of variously coloured markings; there is a narrow median stripe transversing all the segments except the 1st and 13th; the median stripe is particoloured; it is blood-red at the interstices between each two segments beginning from the 4th, and the blood-red portion is always succeeded by a jet-black portion, and the other parts are smoke-coloured; the sides have two approximate, rich brown, rivulet stripes, both edges of which are delicately margined with black; these stripes extend from the head to the 13th segment; below these is a paler stripe, and the belly is also pale, but of a different hue; between the median stripe and the two approximate lateral stripes is a pale brown broader stripe, interrupted with various black markings: on the back of the 7th, 8th and 9th segments is a conspicuous black V-shaped mark, the apex of the V pointing towards the tail, and each terminating in one of the blood-red marks already described; these three Vs are very large, obscuring, on the three segments where they occur, the stripes previously described, and below them are five black dots on each side of the median stripe. The egg is laid in the autumn, on the leaves of Primula vulgaris (primrose), on which this larva hybernates, and is full fed at the end of March: this is the only species of the genus that hybernates. Mr. Hellins remarks that this larva is always to be distinguished by its having but three perfect dorsal markings instead of four, which is the normal number.—*Edward Newman.*

Description of the Larva of Melanippe galiata.—Almost uniformly cylindrical; generally rests in a slightly curved position, but when disturbed or irritated, tucks the head in very tight, so that it touches the 10th segment, giving the anterior part of the body the form of the Ionic volute. Head pale brown, with two broadish dark stripes united on the crown but widely separated at the mouth; the rest of the head is dotted with black: body brown, with parallel stripes of different shades extending its entire length; the median stripe is almost black, and on each side of it is a paler stripe; in each of these paler submedian stripes are four black spots, one each on the anterior edge of the 6th, 7th, 8th and 9th segments; again, outside each of these submedian stripes is a very pale stripe, almost white; then follows a broader, more diffuse and more irregular double brown stripe, perhaps more precisely described as two, brown and closely approximate, rivulet stripes, a very delicate pale stripe passing between them; then follows a paler stripe, in which are situated the spiracles; and, finally, the belly is paler, but striped much in the same way as the back. Feeds on Galium verum and G. Mollugo (two species of bedstraw), and is double-brooded; the second brood of larvæ are full fed on the 5th of September. I am indebted to Mr. Smithson for the larva of this species. Mr. Buckler has represented an extremely beautiful variety, in which the black dots on the back form the nuclei of variegated black, red and white markings.—*Id.*

Description of the Larva of Melanippe fluctuata.—Slightly attenuated towards each extremity; generally rests in a slightly bent posture. Very variable in colour, brown, gray or green: I describe the brown type: head delicately marked transversely with dark brown; median stripe interrupted and of various colours, of which brick-red and deep black are the most conspicuous; a small oblong red space surrounded by dingy white occupies the middle of the posterior margin of each segment after the 4th, and is united to a black spot similarly surrounded on the anterior margin of the succeeding segment; the two combined constitute what Mr. Hellins terms the arrow-head markings; the dorsal surface of the 10th, 11th, 12th and 13th segments is very pale, forming a conspicuous pale patch, and this is continued beyond the posterior margin of the 9th segment; each of the segments after the 4th has four distant and distinct white dots, arranged in a square; those on the 10th, 11th and 12th segments are surrounded with small black markings; the sides are pale; the belly is also pale, but has darker stripes. Feeds on the several varieties of cultivated Brassica (cabbage), on Tropæolum majus (nasturtium) and other garden plants, and is double-brooded, both in a state of nature and in captivity; the second brood of larvæ is full fed on the 5th September.—*Id.*

Description of the Larva of Platypteryx falcula.—Does not roll in a ring or feign death when disturbed; general figure somewhat onisciform, but pointed at the tail; anal claspers represented by two points not used in walking; there are two prominent and distant papillæ or nipple-shaped warts on the back of the 3rd, 4th, 5th and 6th segments; those on the 5th segment smaller and shorter than the others; those on the 3rd and 4th segments are sesquialterous, that is they have a smaller papilla adjoining them on the outer side; the papillæ are crowned with a circle of short brown hairs, and a larger bristle rises from the centre of each circle; the 7th, 8th, 9th, 10th and 11th segments have each two minute warts in the place of papillæ; each of these also emits a bristle: head with the face gray, the crown gray-green, with two transverse reddish bars: body pale green, with testaceous or purplish markings on the mottled back of the 6th and following segments; these markings combine in forming a broad stripe down the middle of the back, the papillæ being of the same colour as and included in the stripe. Feeds on Betula alba (birch); doubles over the corner of the birch leaf, and spins a slight web, in which it changes to a pupa; is double-brooded; the second brood of larvæ is full-fed on the 28th September. For examples of this and the cuspidate larvæ which follow I am indebted to Mr. Thomas Huckett, whose zeal and industry as a collector of Lepidoptera, and as a student of their habits, has rarely been equalled. — *Edward Newman.*

Description of the Larva of Dicranura vinula.—Rests with its flat head drawn into the 2nd segment, and its anterior segments elevated; the body is quite smooth, the dorsal outline rising to a pointed hump on the 4th segment, then falling to the 6th segment, then of uniform substance to the 9th, and thence the body is rapidly attenuated to the 13th, the claspers belonging to which are converted into two horns covered with scabrous points, and each emitting, when the larva is irritated, a slender, pink, drooping filament; head pale brown in front, black at the sides; the recess into which the head is withdrawn is pink, with a large black spot on each side: body with a white lateral stripe ascending obliquely from each side of the head to the apex of the hump, then descending obliquely to below the spiracle on the 8th segment, then again ascending elliptically and terminating at the base of the horn-like claspers; above this white stripe the body is whitish, longitudinally striated with purple-brown, the white predominating along the median line, the purple-brown predominating in the vicinity of the lateral white stripe; below this white stripe the body is yellow-green, with the exception of a purple-brown blotch, nearly round, just above the clasper on the 8th segment: this blotch is bordered above with white; the legs are yellow-green, with a black ring at the base and black tips; the eight normal claspers are green, the two horn-like anal ones whitish with black scabrosities. Feeds on several varieties of narrow-leaved Salix (willow); is full fed in July; crawls down the stem of the willow to within two, three or four feet of the ground, then gnaws out the bark and spins an extremely tough gluey cocoon in the excavation thus made; in this gluey cocoon it changes to a pupa, and remains in that state all the winter.—*Id.*

Description of the Larva of Stauropus Fagi.—Does not roll in a ring or feign death when disturbed; when at rest throws back its head so as entirely to hide the 2nd, 3rd and 4th segments; the head being quite equal in bulk to these three segments if united; the posterior segments are at the same time elevated in an extraordinary manner; 1st pair of legs of moderate size, 2nd and 3rd pairs with the femora and tibiæ extremely lengthened; body deeply incised; 5th, 6th, 7th, 8th, 9th and 10th segments each with two humps; those on the 5th, 6th and 7th largest and of equal size, the others gradually decreasing in magnitude; 11th, 12th and 13th segments without humps; 11th segment with a small, flattened, dilated, crenulated, lateral margin; 12th with a much more extensive margin, having the same characters; 13th segment having the two anal claspers converted into stiff, slightly clavate, slightly curved appendages or tails. The colour is testaceous-brown, covered throughout with pale points like shagreen; there are two interrupted, slender, black stripes down the back, and a paler median stripe between them; there are moreover several slender black markings on both sides of the larva. This singular larva, which is known to collectors as "the lobster," feeds on oak, and is full fed on the 25th September; it then spins together two or three oak leaves, and makes a retreat wherein to form its cocoon; in this it changes to a pupa, and when the united leaves fall on the approach of winter, they form a kind of parachute, which conveys the pupa gently and safely to the ground, where it remains throughout the winter.—*Edward Newman.*

Description of the Larva of Clostera reclusa. — When at rest maintains a straight posture, the ventral surface being closely appressed to the leaf or twig of the food-plant. Head black: body with a very broad median gray stripe down the back, in which stripe is a central, tubercular, velvety spot on the 5th, and another on the 12th segment; this stripe also contains yellow transverse markings, which are very distinct on the 3rd, 4th and 6th segments: on each side of the gray median stripe is a broad, lateral, smoke-coloured stripe; the belly, legs and claspers are also smoke-coloured, and between the smoke-colour of the lateral stripe and that of the belly is a narrower stripe, composed of black and yellow spots and dots, and including the spiracles: the entire body of the larva is slightly hairy. Feeds on Salix capræa (sallow), and Populus tremula (aspen), and is double-brooded; the first brood is full fed on the 5th July, the second on the 28th September; then spinning a web amongst the leaves of its food-plant, and turning to a pupa in the retreat thus fabricated, it remains in that state throughout the winter.—*Id.*

Description of the Larva of Ptilodontis palpina. — Does not roll itself in a ring or feign death when handled. Head rather small: body without hairs or humps, but rough with transverse wrinkles. Colour of both head and body glaucous green, with six stripes; two of these are slender, white, tolerably near together, running parallel down the back; each of them is composed of minute, raised, white warts; on each side of these is a lateral stripe of the same hue, but more slender, less conspicuous and less evidently composed of warts; and below this on each side, just above the spiracles, is a most distinct yellow stripe, delicately margined above with intense black; on the 2nd and 3rd segments is a little patch of delicate lilac immediately adjoining the yellow stripe; the two middle dorsal stripes and the yellow spiracular stripes, together with their black margin, extend along the head to the very mouth; but the middle stripe on each side does not enter the head. Feeds on several varieties of broad and narrow-leaved Salix (willow and sallow), and on more than one species of Populus (poplar); is full fed on the 2nd of October; spins on the surface of the ground, and remains in the pupa state all the winter.—*Id.*

Description of the Larva of Notodonta camelina.—Does not roll in a ring or feign death when handled; when at rest it raises both ends. Head of moderate size, greenish; body uniformly cylindrical to the 12th segment, which is rather tumid, and has two distinct but approximate warts on its back. The colour is glaucous green, paler on the back; the warts are tipped with pink and armed at the tip with a small fascicle of short black bristles; a slender bluish median stripe originates on the back of the 3rd segment, and passes in a direct line to between the pink-tipped warts on the 12th segment; the back is particularly inclined to white on each side of this median stripe; on each side of the body is a series of white spots, most of which enclose a black spiracle, and behind each white spot, and closely adjoining it, is a pink spot; this series of spots is connected together by a number of slender white lines, and the whole together constitute what might with propriety be called a spiracular stripe. All parts of the body emit scattered black bristles, the head and second segment have more than the following segments; the legs and claspers are pinkish; the belly is distinctly green. Feeds on Betula alba (birch), Acer campestris (maple), Quercus Robur (oak), &c., is full fed on the 20th of September; it spins a slight cocoon on the surface of the earth, and remains in the pupa state all the winter.—*Edward Newman.*

Description of the Larva of Notodonta dictæa.—Does not roll in a ring or feign death when disturbed, rests in nearly a straight posture, as when crawling. Head rather large, very slightly notched on the crown, shining, pale green; body almost uniformly cylindrical until the 12th segment, which is humped, the hump terminating in a moderately sharp point; body whitish or glaucous-green on the back, a broad paler green stripe on each side, and adjoining it a narrow raised yellow-green stripe just below the spiracles, and touching all of them except that on the 12th segment, it extends the entire length of the insect, terminating in the anal clasper; on the summit of the 12th or humped segment is a black transverse line. Feeds on Populus nigra (black poplar), Salix capræa (sallow), Betula alba (birch), &c.; is full fed on the 22nd of September: spins a slight web on the surface of the earth, attaching the upper part of the web to a fallen leaf; it remains in the pupa state throughout the winter. There is a very common variety of this larva, plain brown without the slightest appearance of the lateral stripe: this after the last change of skin.—*Id.*

Description of the Larva of Notodonta dictæoides.—Does not roll in a ring or feign death when disturbed; rests in nearly a straight posture, as when crawling. Head rather large, being slightly notched on the crown, brown, shining. Body almost uniformly cylindrical until the 12th segment, which is humped, the hump terminating in a somewhat sharp and very shining papilla; the 13th segment is rugose above; back purple-brown, very shining when full fed; on each side is a distinct yellow stripe, which includes the spiracles, excepting that on the 12th segment; the spiracles are black; the belly is much paler than the back. This larva, when compared with that of Notodonta dictæa, may be distinguished by its somewhat more slender proportions, by its more glabrous skin, by its uniformly possessing the purple-brown hue, and by the greater brightness and distinctness of the lateral stripe. Feeds on Betula alba (birch), and is full fed on the 27th of September, when it descends to the ground, spinning a slight cocoon between the surface of the earth and a fallen leaf: it remains in the pupa state all the winter.—*Id.*

Description of the Larva of Notodonta Dromedarius.—Does not roll up in a ring or feign death when disturbed; rests with both extremities elevated, and its anal claspers, which are rather long, porrected, but these can be used in walking when required. Head manifestly larger than the 2nd segment, bifid at the crown, the lobes blunt and rounded; shining brown, speckled with darker brown, the sides rather paler: body not regularly cylindrical, but uneven, humped on the 5th, 6th, 7th, 8th and 12th segments; the hump on the 8th segment is the least, those on the 5th, 6th, 7th and 8th have obtuse summits directed backwards; that on the 12th segment is erect. Colour of the body yellow-green, with purplish brown markings, which form a conspicuous stripe on the back of the 2nd, 3rd and 4th segments, and which crown all the five humps and fill the interstices between the 2nd and 3rd, and 3rd and 4th; on the fifth hump this purple-brown colour forms a mere line, and there is a similar line on the last or 13th segment: a very similar colour occupies nearly the whole of the belly, which is darkest on the 10th, 11th and 12th segments. It feeds on Betula alba (birch), and is full fed on the 29th of September, when it descends the tree and generally spins a slight cocoon on the earth, attaching the upper side of the cocoon to a fallen leaf: in this situation it remains in the pupa state all the winter.—*Id.*

Description of the Larva of Notodonta Ziczac.—Does not roll in a ring or feign death when disturbed; rests with both ends of the body elevated. Head large; body with one hump each on the 6th, 7th and 12th segments, that on the 6th largest and pointing backwards. Head brown: body purple-brown, with darker patches on the back of the 2nd, 3rd and 4th segments, also on the front of the dorsal humps: these darker patches are bordered with paler margins, there are also paler oblique lines on the sides of the segments; 11th and 12th segments yellowish, dorsally marbled with brown; there are two pale approximate lines on the back of the 8th, 9th and 10th segments. Feeds on several species of Populus (poplar and aspen) and Salix (sallow and willow), and is full fed at the end of September, when it spins its slight cocoon on the surface of the earth, and remains in the pupa state all the winter.—*E. Newman.*

Description of the Larva of Notodonta dodonæa.—Does not roll in a ring or feign death when disturbed; rests in nearly a straight posture, the anal claspers being sometimes, but not always, raised, and I have never observed the head thrown back. Head larger than the 2nd, 3rd and 4th segments, bluish green, reticulated; body pale green, transversely wrinkled; two yellowish and very narrow stripes near together down the middle of the back; these are composed of yellow dots: two similarly dotted stripes are observable outside these, but not extending beyond the 6th segment; on each side of the larva, extending from the head to the anal point, is a raised pale stripe, which is alternately pink and pale yellow, and which includes the spiracles. Feeds on Quercus Robur (oak), and is full fed on the 4th of September, when it spins a slight cocoon on the surface of the ground, and changes to a pupa, in which state it remains throughout the winter.—*Id.*

Description of the Larva of Xylophasia lithoxylea.—The larva of Xylophasia lithoxylea being marked unknown, I beg to say I have bred the insect this summer from a larva found at the roots of grass: it was of large size; colour dirty white, with a bluish tinge below; head and tail black, with two rows of black shining spots on each segment, one hair in each spot. I found it on the 8th of May; it seemed then nearly full fed: the perfect insect appeared on the 8th of July.—*John E. Robson; Queen Street, Hartlepool.—'Intelligencer.'*

Description of the Larva and Pupa of Achroia grisella.—I met with this species about three weeks ago in the apiary of a neighbour. A description of the insect in its larva and pupa states may not be uninteresting. Larva about nine lines in length when full fed; very active, throwing itself into violent contortions at the slightest annoyance; white with a tinge of pink; rather hairy; the head and second segment reddish brown; spiracles barely perceptible. Pupa pale brown, enclosed in a white cocoon; usually secreted under the inside ligaments near the entrance of the hive. Does Achroia grisella hybernate? I found my specimens in what were said to be hives of the present year, and the perfect insects are now making their appearance.—*Thomas Fyles; Scotter, Kirton-in-Lindsey, October* 3, 1860.—*Id.*

Note on the Habits, &c., of Diasemia literalis as observed near Plymouth. — This species has occurred near Plymouth this year, at two very distinct periods, *viz.* in June and September, which makes it appear as though the species, were double-brooded; but not having visited the place where it appeared in the intermediate months, I have no further proof of its double-broodedness than seeing and capturing it at the times mentioned. I took about two dozen specimens. "In July," says Mr. Stainton, "Diasemia literalis makes its appearance: this insect has generally occurred only singly, and in *dry* places, though the idea had long been prevalent that, like the Hydrocampæ, it was attached to ponds." The idea of its being attached to ponds is certainly wrong, at least in the imago state; and I think it can hardly be so in any stage, seeing there is no water in the neighbourhood of its habitat. This insect in habits rather resembles the Pyraustæ, flitting about in short flights during sunshine, and not easily approached in shade. The locality for it is a high, sloping down, where the furze and fern are the principal occupants of vegetable growth, but there are also the usual plants that cover a Devonshire down, heath or moor; some fine clumps of Ericæ are there, and "I know a bank a whereon the wild thyme blows." I can safely advise those who may wish to take the species to look for it in a *dry* place.—*J. J. Reading; Plymouth.*

Vespidæ in 1860. By S. Stone, Esq., Hon. Member Ashmolean Society.

It may with truth be remarked that we have passed through an entire year of which neither spring nor summer has formed any portion, the weather having been altogether of a wintry character during the whole of the past twelve months. Had we been deprived of the blessing of sight we should have been completely in the dark as to how the year was progressing: we have only been able to ascertain it by observing that somehow or other the fields became clothed with verdure, that the foliage was renewed on hedgerows and trees, that the grass grew till it arrived at maturity, in spite of the night frosts which made repeated and desperate attempts to cut it down and thus anticipate the mower, that some of it by some means got made into hay, that the corn—a portion of it—became ripe and was gathered in, that the days grew longer, till the maximum length had been attained, and that they then as usual began to shorten. Had we depended solely on the temperature for information we should have been sorely perplexed, in fact we should have been wholly unable to decide whether we were living in the month of July or January, whether the sun was about to enter Aries, or whether it had got into Libra.

Female wasps, which ordinarily make their appearance early in April, and not unfrequently in March, were not observed upon the wing till late in May, when a few showed themselves for a day or two, and were apparently in search of eligible building sites, the weather just then being bright and sunny, but with severe frosts at night. I at once set about forming a number of suitable cavities in the locality they frequented, hoping thereby to obtain, as I had done the year before, a variety of nests, but the drenching rains which fell immediately after I had completed them, and which continued almost without intermission for weeks, cut off the expectations I had formed; not a single chamber became tenanted, nor were the insects again to be seen near the spot, which was in the immediate vicinity of the place in which hundreds of young females had the previous autumn been reared.

Early in July I was rather astonished at seeing a young working wasp busily employed in gathering materials for building. This was at Cokethorpe Park, a favourite locality for various species of Vespidæ. From this circumstance I knew that one female had succeeded in founding a colony. It was not long before I met with other workers, at distances so far apart as to make it apparent there must be more than one or two nests in the neighbourhood. All doubt upon the point was removed on obtaining specimens, which proved to be of four different species, *viz.*: Vespa germanica, V. vulgaris, V. rufa and V. sylvestris. It was not until the end of the month that I succeeded in discovering a nest which turned out to be one of V. germanica. I did not immediately take possession of this nest but made diligent search for one of V. vulgaris, my object being to obtain, if possible, one containing larvæ of Ripiphorus, a parasite I have never yet found, except in nests of that species. In my search I met with one of V. rufa, which I immediately dug out, taking it away, but purposely leaving a number of the workers behind, carefully replacing the sods I had removed over the cavity and making an entrance thereto from without. In the course of a few days I found, as I expected would be the case, that a fresh nest had been begun by the workers I had left behind, and that the work was being briskly proceeded with.

About the same time a nest, or rather the situation of one, was pointed out to me by the gardener at Cokethorpe Park. It was in a wall in the kitchen garden some ten or twelve feet from the ground. The stones forming the inner portion of the wall were lying hollow, so as to allow of the construction of a nest of small size, such as is that of V. sylvestris, of which species this was. Probably the weather influenced the parent wasp in her choice of a situation and caused her to fix on this novel one. With reference to this species I may remark that, with the exception of the one mentioned above, all the nests I have met with have been constructed under ground. Mr. Smith, however, considers it to be rather a tree-building species than an underground one. In lightness of appearance and elegance of shape the nests of this species far surpass those of any other of the British Vespidæ.

A specimen of V. Crabro was next observed. This insect I succeeded in tracing to the nest, which was situated in the head of a pollard ash that had been cut down and was lying in the wood-yard at Cokethorpe. There did not appear to be more than about twenty workers developed at that date.

I next discovered a second nest of V. rufa, which I dug out, and, as before, left a number of the workers behind: these, as in the former case, immediately set about the construction of a fresh nest.

I now succeeded in finding one of V. vulgaris, which I duly took possession of. On digging it out I found that the original nest, after having attained a considerable size, had succumbed to the incessant rains which fell, and had fallen, with the exception of the upper comb, to the bottom of the cavity in which it had been built, where it was lying, a mass of decomposed and offensive matter. The parent wasp would appear either to have perished with it or to have abandoned the spot when the catastrophe occurred, as at the time I dug into it, she was nowhere to be found, and, moreover, there was unmistakeable evidence that she had had no hand in the work, or in directing the work, of the nest which had arisen over the ruins of the original one. On removing the covering the interior presented an appearance so unlike the interior of one over which a queen presides that I at once felt convinced no queen had ever set foot in it. No order or regularity was observed in the disposition of the combs; small ones, to the number of seven, were to be seen stuck about here and there upon the face of the original one, from which they depended, while the cells were crowded with eggs or small larvæ, one cell containing as many as sixteen eggs, and but few less than five or six. The colony—for having chloroformed I secured the whole lot—consisted exclusively of workers, and they rather under than over the average size. On reaching home I placed the nest, with the insects belonging to it, near the window of an empty room, where the larvæ were fed, and fresh eggs continued to be deposited by these workers, but no attempt was made to renew the covering or to construct fresh cells.

I now took out one of the nests of V. rufa that had been formed by the workers after the removal of the original one, and in a few days afterwards the other. Each contained a single comb, that in the former being about an inch and a half in diameter, and the latter about an inch. The cells in each contained a profusion of eggs as well as larvæ of various sizes. In many of the cells the larvæ had become full fed and had spun themselves up, in which case, as well as where they had attained to anything like their full size, they occupied each a separate cell, while each of the remaining cells contained either a group of eggs or a number of larvæ. Both these colonies consisted of workers of the ordinary size, the whole of which I secured, and in both instances fresh eggs continued to be deposited by them after the nests had come into my possession and had been placed in a favourable situation for work.

In order to ascertain what proportion of the workers in each of these three nests—the two of V. rufa and the one of V. vulgaris—possessed the power of producing eggs, I chloroformed the whole number so effectually as to cause them to

> "Sleep the sleep that knows no waking,"

and then made a *post-mortem* examination of the bodies, the result of which was that in each case one in every five or six was found to contain a mass of eggs, some ready for extrusion, others in a less advanced state. I have a number of these eggs preserved in spirits, and have also preserved the insects from whose bodies they were extracted. These I will place in the hands of Mr. F. Smith, of the British Museum, who, I doubt not, will kindly take charge of them, and allow any Hymenopterist to examine them who may wish to do so, in order that they may satisfy themselves that the specimens are those of common working wasps and nothing more.

I now made an attempt upon the nest of V. germanica, but owing to the hollowness of the ground the attempt was an unsuccessful one. I therefore put in an extra dose and left it until the following evening, when I found the whole of the insects dead. I took the nest home, but did not remove the covering for several days: when I did so I found the cells crowded with eggs or larvæ, just as I had previously observed to be the case in the nest of V. vulgaris: there was, however, nothing unusual in the shape or disposition of the combs, nothing in the appearance of the nest beyond the circumstance I have just mentioned, to indicate that it was not one governed by a queen. The lower comb consisted of cells of large size, evidently intended for the reception of female-producing eggs. No queen was found in the nest, but I am unable to say whether she might or might not have fallen out of it on its removal. I could obtain no satisfactory results from an examination of the bodies of the workers in consequence of the decomposed state in which they had become.

On the 7th of September I stormed and took the nest I had previously discovered of V. Crabro, securing the whole colony, which consisted of about a hundred individuals, alive. The means employed in the capture of these insects, and with them a specimen of Velleius dilatatus have already been made known to entomologists, a detailed account having been published in the 'Intelligencer.' The nest with its inmates was placed in a glazed box and removed to a room near where I reside, a distance of about two miles from the place of capture, and there the work of building, &c., was resumed, and has since been steadily carried on. The covering of this nest is not one which completely encloses the combs, like those formed by the other species of social Vespidæ, but merely one that resembles an inverted basin or bowl placed over them, and which reaches to about an inch below the lower one, the necessary additions being made to it on the construction of every fresh comb to bring it to about the point I have stated, beyond which it is not allowed to extend, for if one set of workers should, as sometimes happens, venture to make such additions to it as to bring it beyond that point, another set may be observed busying themselves in the work of demolition.

They work with great steadiness throughout the night by the light of a candle—rushlight rather—with which I supply them, and it struck me as being remarkable that when this artificial light was introduced to them, or they to it, for the first time, it did not cause the least disturbance among them, but that they at once began to work by it just as though it had been the light of day. Another thing remarkable is, that while the nest was in its original situation a number of the workers might be seen going out and coming in, all night, by the light of the moon, or even by that of the stars when the sky was clear, but since its removal to the situation it now occupies, not a single individual has ever ventured out after nightfall, whether the moon has been shining brightly or not. This may perhaps in part, but cannot I think be wholly accounted for, from the fact that they can now procure building material, as well as food, without leaving the box in which they reside, a constant supply of both being kept immediately under and around the nest.

In conclusion I may remark that the nests I have enumerated were obtained within a very limited space. No two were situated half a mile apart, and all except one were found within two or three hundred yards of each other. I know, from repeatedly observing bodies of workers apparently catering for the undeveloped young, that two others, one of V. rufa, and one of V. sylvestris, might have been found in the immediate vicinity, but time did not permit me to make search for them, and I have no doubt that if other parts of the park had been as thoroughly examined as the limited portion to which my attention was directed, many others might have been obtained. That there has been a comparative scarcity of the Vespidæ is unquestionable, still I think, if diligent and persevering search had been made, a sprinkling of nests over all parts of the country would have been found, since it is unlikely this locality should, in reality, be a more favourable one than others. Here no one beside myself, except in the case of V. sylvestris, has discovered a nest, but all have declared that they "have not seen a a single wasp this year." I should doubtless have been unsuccessful, but that I had resolved upon procuring nests if they were to be found, and both eye and ear, and time and attention, were forthwith wholly engaged in the search. The result goes to prove that, however adverse a season may be, a number of the Vespidæ sufficient to preserve the race, and prevent its extinction, will be sure to be enabled to struggle through it. S. Stone.

October, 1860.

Capture of Haltica Atropæ in Britain.— I beg to send you some specimens of a Haltica new to Britain, the Haltica Crepidodera Atropæ; it was first taken by my friend Mr. John Gray, on the deadly nightshade (*Atropa Belladonna*): Mr. Wollaston and I subsequently joined Mr. Gray in a second visit to the locality, and we took two or three hundred amongst us. Dr. Power had previously taken the same species near Reigate, and had the specimens undetermined in his boxes: I had also taken some specimens some years ago near Northampton. — *Hamlet Clark; October* 8.

Occurrence of Bagöus nodulosus in Hammersmith Marshes. — I beg to send you a notice of the capture of a new British Bagöus. I should have recorded it before, but have been waiting to hear from Mr. Walton. Mr. Waterhouse has kindly gone over the few British species of the genus with (and after) me, and unites with me unhesitatingly as to the correctness of my opinion on the point. On the 19th of August last I captured at Hammersmith marshes a solitary example of this species, which is certainly not included in the national collection, or in any other I have had an opportu- of examining. It is the Bagöus nodulosus of Schönherr, and must be placed between B. binodulus and B. limosus in our lists. At first sight it resembles the first of these two species, but it is rather broader and not so long. The chief points of difference being that in B. nodulosus the thorax, which wants the constricted hinder margin of B. binodulus, has the dorsal furrow scarcely perceptible, whereas in the latter species it is very distinct. The elytra also in B. nodulosus are much more evenly and deeply sulcated, the interstices being elevated and roughly granulated instead of merely punctured, whilst the second from the suture is without any posterior nodule, so that B. binodulus has, on each elytron, four knobs, and B. nodulosus only two. It appears from Schönherr to be an inhabitant of Germany.—*E. C. Rye; 284, King's Road, Chelsea, S.W., October* 18, 1860.

Correction of an Error. — I find I have described the species of Hallomenus as "fuscus" ('Intelligencer,' vol. viii. p. 179); this ought to be "humeralis," and is the species described by Mr. Janson in the 'Annual' for 1859, p. 142. In quoting the record of its capture into the 'Zoologist' it is said I took it "near Lee." It was not taken there.—*John Scott; 13, Torrington Villas, Lee, S.E., October* 4, 1860.

[Mr. Douglas informs me he took this insect at Charlton.—*E. Newman.*]

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

October 1, 1860.—H. T. STAINTON, Esq., V.P., in the chair.

The following donations were announced, and thanks ordered to be presented to the donors:—'The Journal of the Royal Agricultural Society of England,' vol. xxi. Part 1; presented by the Society. 'Proceedings of the Royal Society,' vol. x. No. 40; by the Society. 'Mémoires de l'Académie Imperiale des Sciences, Belles-Lettres et Arts de Lyon,' Classe des Sciences, Tomes viii and ix.; Classe des Lettres, Tome vii.; by the Academy. 'Annales des Sciences Physiques et Naturelles d'Agriculture et d'Industrie de Lyon,' Tomes ii. and iii.; by the Society. 'Exotic Butterflies,' Part 36; by W. W. Saunders, Esq. 'The Journal of the Society of Arts' for September; by the Society. 'The Zoologist' for September; by the Editor.

Election of a Member.

M. Deyrolle, of Rue Rivoli, Paris, was balloted for, and elected a member of the Society.

Exhibitions.

Mr. Janson exhibited specimens of Epitrix Atropæ, *Maerkel*, *Foudras* (Crepidodera Atropæ, *Allard*), taken on Atropa Belladonna, near Arundel, by Mr. Wollaston and the Rev. Hamlet Clark, on the 8th ultimo. He remarked that several examples of this species, new to the British list, had been found a few days previously in the same locality by Mr. John Gray, and he had this morning heard from Mr. S. Stevens that specimens, reported at the time as the E. pubescens of Panzer, were taken by Mr. H. Francis near Reigate, on the 22nd of June last. He also remarked that this insect, considered by the older entomologists as a mere variety of E. pubescens, and beautifully figured as such as far back as 1803, by Sturm in the 'Entomologische Hefte,' was first signalised as a distinct species by Herr Maerkel, and that the late M. Foudras of Lyons had described it in his extraordinary work 'Altisides de France,' and pointed out the differences between it and its near allies Epitrix pubescens, *Panz.* and E. intermedia, *Foudras*; and further that the genus Epitrix is not accepted by by M. Allard, in his 'Essai Monographique sur les Galerucites Anisopodes, *Latr.*, ou Description des Altises d'Europe et des bords de la mer Méditerranée,' of which the first portion has recently appeared in the 'Annales de la Société Entomologique de France,' who places the E. pubescens and E. Atropæ at the end of the genus Crepidodera, remarking with respect to the latter that "elle n'est peutêtre q'une variété de la pubescens;" but the form of the ædeagus, described by M. Foudras, is so dissimilar in the two insects, and, setting aside size and colour, the difference in the form and sculpture of the prothorax, although in creatures thus minute scarcely perceptible to the unassisted eye, is so apparent under a lens, that he entertained no doubt whatever as to the propriety of considering them good and distinct species.

Mr. Janson also laid before the meeting a box, handed to him for that purpose by Mr. Baly, containing examples of closely allied species of Donacia, Chrysomela and Paropsis: by the side of each specimen, mounted on card, were placed the generative organs extracted from it. He called particular attention to these organs as exhibiting striking differences in species so closely resembling each other as to be readily taken for mere varieties, and to the perfect condition of the insects which had been submitted to this operation, showing that with a little practice and care the most valuable insects may be thus treated without injury.

Mr. Stevens exhibited two examples of Diachromus germanus, taken at Hastings a few years ago; and a specimen of Coptodera massiliensis, found alive in the street at Hastings many years since by Mr. Rankings.

Mr. Waterhouse considered this latter insect had most probably been imported amongst foreign plants.

Mr. Stevens also exhibited a small collection of insects of various orders made by Mr. Oxley in New Zealand; and a large box of Coleoptera and Lepidoptera from the vicinity of the Cape of Good Hope, sent home by Mr. Trimen; also fine specimens of Goliathus Derbyanus, from the interior of Africa, likewise forwarded to this country by Mr. Trimen.

Mr. Westwood exhibited a box of exotic Lepidoptera, recently obtained in Paris, containing many rare and interesting species, especially several collected by M. Lorquin in the Philippine Islands, including Papilio Dædalus, Zethera Pimplea (of which the male only had been hitherto known—figured by Erichson—the female now exhibited being totally unlike the male), Debis Lorquinii, a species belonging to the family Satyridæ, but having the wings of the male of a resplendent blue colour; also Morpho Aurora, *Westw.* (a lovely species of great rarity), several brilliant Erycinidæ, a fine new Paphia from Columbia, and a remarkable Adolias from the Philippine Islands; likewise specimens of both sexes of Saturnia Cynthia and S. Ricini, reared at Paris, as well as specimens of both sexes of a hybrid variety reared between the two last mentioned species. Unfortunately, owing to the absence of M. Guérin Méneville from Paris during Mr. Westwood's visit, he had not been able to obtain any detailed account of the circumstances under which these hybrids had been produced, nor had he learned whether they were prolific. M. Guérin himself had given in the 'Annales de la Sociéte Entomologique de France,' 1859 (Proc. p. xlvi.), some account of these hybrids showing their peculiar tendency both in structure and habits to one or other of their parents. On the occasion when this account was given to the French Society, M. Aubé suggested the probability that the two supposed parent species were not specifically distinct, but were, on the contrary, only races due to domesticity, an opinion which Mr. Westwood was induced to adopt, although the circumstances connected with the two supposed species as regarded their food-plants, relative capability of enduring cold, time of pupation, &c., if applied to great numbers of the Micro-Lepidoptera would be regarded by most modern Lepidopterists as decided evidence of distinctness of species. Even supposing these hybrids are not fertile (upon which, however, Mr. Westwood had no information) the fact of the facility with which the species had been crossed seemed to him to show that the parents were more nearly related than if they were really distinct species.

Mr. Lubbock wished Mr. Westwood would confirm by actual experiments his repeatedly expressed opinion that very many of the so-called species, both of Macro- and Micro-Lepidoptera, were mere modifications produced by diversity of food, locality, &c.

Mr. Stainton observed that the hybrid Saturniæ exhibited by Mr. Westwood were larger and finer insects than either S. Ricini or S. Cynthia; he thought such would hardly be the case if they were mere local varieties of one species.

Mr. Syme exhibited a female specimen of Sphinx Convolvuli, which had emerged from the pupa on the 15th ult. It had been produced from a larva found in a potato field at Deal in the autumn of last year, and had remained nearly a year in the pupa state; the eggs contained in the abdomen were, however, extremely small.

Mr. Smith exhibited a specimen of a Danish humble-bee (*Bombus equestris*) caught by Mr. J. Stevens on board a steamer at sea, midway between Hamburg and Lowestoft, and consequently about two hundred miles from land.

Mr. Smith also exhibited two parasites found on Anobium paniceum, received from Dr. Power. The insects, which were a species of Pteromalus, had been found by that gentleman on the Anobia, bred in a preparation of a human arm which had been laid aside for some time.

Mr. Janson observed that he had frequently met with Anobium paniceum associated with a minute Hymenopterous parasite closely resembling, he would not say identical with that exhibited by Mr. Smith, in druggists' shops, amongst pearl barley and coriander seed.

Mr. Stainton exhibited, on behalf of the Rev. Mr. Hellins, drawings of the larvæ of the nine British species of the genus Melanippe, admirably executed by Mr. W. Buckler. The larvæ delineated had in all instances been bred from the eggs, and were represented both of the natural size and magnified.

Mr. Bond exhibited some Lepidoptera from the Isle of Wight, including a fine example of Leucania vitellina, and the female of Agrotis cinerea, both captured by Mr. Rogers; and a beautiful series of Heliophobus hispida taken by himself.

Mr. Stevens communicated some extracts from a letter received by him from Mr. R. Trimen, on the Entomology of the Cape of Good Hope.

Mr. Janson said that he was desirous of contradicting a report in circulation relative to Donacia Comari, exhibited by him at the previous meeting as a species hitherto unrecorded as British, to the effect that it is described by the late Mr. Stephens under the name of Donacia Proteus, and had therefore been long known as indigenous. He stated that the facts are simply as follows. *First*, Stephens' Latin diagnosis of D. Proteus is copied *verbatim* from Kunze; his description is an abridged translation from the same author. *Secondly*, D. Proteus of Kunze is identical with D. sericea of Linneus, and has been cited on all hands for the past twenty years as a synonym of that species. *Thirdly*, D. sericea of Linneus and D. Comari of Ahrens and Suffrian (D. sericea, *Ahrens olim nec Linn.*) being a distinct species it is obvious that Stephens' description cannot refer to D. Comari. Moreover the "prominent anterior angles of the thorax" of Stephens' description of D. Proteus apply incontestably to D. sericea of Linneus and not to D. Comari, which has those angles obtuse and deflexed.

Supposed new Species of Nonagria.

Dr. Knaggs exhibited some specimens of an undescribed species of Nonagria? taken at Folkestone, and read the following remarks and description:—

"It may be recollected that specimens of Nonagria concolor were taken for the first time in this country at Whittlesea Mere, in the year 1849, and for the last time, in the same locality, in 1850. The spot was afterwards destroyed by fire, and subsequently cultivated, since which the insect has been seen no more. Its time of appearance was June, and it came to 'sugar.' In 1859, at Folkestone, I captured specimens of a Nonagria which bore considerable resemblance to this species, and which was returned by M. Guenée as N. concolor. Through the kindness of my friends Messrs.

Doubleday and Bond, who have lent me specimens of the true N. concolor for comparison, I am enabled to give the following characteristics, which I think justify the acceptance of my specimens as a species totally distinct from Nonagria concolor, and new to Science. In the following remarks I shall designate my specimens Nonagria Bondii.

"In addition to the larger size of Nonagria Bondii, and the difference in colour, the fore wings being constantly paler, the hind wings darker in N. Bondii than in N. concolor, there are other distinguishing characters. In shape N. concolor approaches that of a Glæa, N. Bondii that of a Noctua; for instance, the costa of the fore wings in N. concolor presents from the base to the middle a convex curve, and for the rest is straight, or if anything even slightly concave; while in N. Bondii there is a gradual convex curve from base to apex; if there is any straightness or approach to concavity it is on the basal side of the middle of the costa. Again, the hind margin of the fore wings is considerably more angulated in N. concolor than in N. Bondii; in the latter the curve is much less abrupt, gradual, and in some cases inappreciable. The costa and inner margin are also more parallel in N. concolor, and there is consequently less breadth of the fore wings from the costa to the anal angle; and the breadth at the insertion seems also greater in proportion in N. concolor than in N. Bondii. The hind wings are much more oval in N. Bondii, and are devoid of a concave notch a little below the costa which is constant in N. concolor. The general appearance of N. Bondii is much more slender than that of N. concolor, especially as regards the proportionate size of the thorax. The antennæ are much longer, legs darker, larger and much less hairy in N. Bondii than in N. concolor, indeed in the former the legs are comparatively almost naked. With respect to markings, there is a constant dotted line more or less distinct at the insertion of the cilia in the fore wings of N. concolor, totally wanting in N. Bondii. There is on the other hand a constant shade in the centre of the hind wings in N. Bondii, absent in N. concolor; and while the under surface of the fore wings is dark sooty gray in N. Bondii, it is pale brownish gray in N. concolor; this, too, applies to a certain extent to the under side of the hind wings, in which however other differences are visible. The palpi of N. concolor are larger, stouter and much more thickly clothed with scales than in N. Bondii, although the latter is the larger insect, and the palpal scales show considerable difference respectively under the microscope. The down from the tippet is very diagnostic under the microscope in N. concolor; each scale at its free end is notched with four or five deep serrations, while in N. Bondii these serrations are either entirely wanting or there are two very slight lateral serrations. Scales, from corresponding points in the wings of the respective species, present considerable differences, but owing to the difficulty of obtaining them all of the same size their comparison is not so satisfactory as I could wish.

"The above microscopic observations were made from insects of the same sex, namely, females; and when to these it is added that N. concolor used to appear from the beginning to the middle of June, mine from the end of June to the end of July; that N. concolor is a fen insect, mine a coast insect; that N. concolor used to 'come to sugar,' whereas I never knew N. Bondii to do so until the second flight (about 11.30 P.M.), I think that I have some reason in bringing this forward as a distinct species; and as it is on all sides admitted that if not N. concolor it is new to Science, I beg to maintain the latter, and propose for my insect the name of

NONAGRIA? BONDII.

Alis anticis amplioribus, ovato-triangularibus concoloribus osseo-albis, serie punctorum semicirculari inter marginem posteriorem mediumque ductâ, subtus tenebrosis; alis posticis ovatis fumeo-cinereis umbra centrali tinctis; fimbriis candidis; thorace et abdomine tenuibus; antennis longioribus.

Exp. al. 1 in. 2 lin. ad 1 in. 3½ lin."

Ravages of Hylobius Abietis.

Mr. Janson communicated the following extracts from a letter which he had addressed to Mr. Walter Elliott, of Wolfelee, Hawick, N.B., in reply to his request for information relative to the economy of Hylobius Abietis, and the plans best adapted to arrest the ravages of this beetle:—

"London, Sept. 18, 1860.

"My dear Sir,—Your favour, accompanied by specimens of Hylobius Abietis and twigs of larch from which they had gnawn the bark, reached me in due course on the 3rd. The interesting remarks on the ravages of the beetle, and the specimens, were communicated to the Society at its meeting on the same evening, and an account will appear in the 'Proceedings.'

"Having ransacked such foreign works as I possess which treat on insects injurious to foresters, for information respecting the Hylobius, the following memoranda will perhaps prove not altogether unacceptable.

"This beetle appears to attack indiscrimately all the species of fir cultivated in Germany, preferring however, according to Ratzeburg, Pinus sylvaticus and P. abies. In countries where firs are not grown this insect seems to be unknown.

"It is the perfect insect alone which is directly injurious. It gnaws the young shoots, causing them to wither. The extremities of a tree thus attacked (the most vigorous and healthy trees are invariably selected by the beetle) several years in succession, sickness and death inevitably ensue; in dry seasons especially, the mischief this beetle occasions in fir woods where it abounds, is almost incredible.

"The perfect beetles emerge from May to October, and copulation takes place from the period first named to about the end of June, but is rarely witnessed later in the year: the beetles which make their appearance after this time hybernate, and do not copulate until the ensuing spring. The female deposits her eggs, and the larvæ subsist, either in the stems of sickly or dead, standing or felled trees, or in the stumps and roots of those which have been felled remaining in the ground, and are therefore scarcely to be considered as directly injurious. Hence it will be obvious that by grubbing up all stumps, and keeping the plantations cleared of all sickly and dead trees, an important step will be made towards reducing the numbers of the beetles. All timber should be barked as soon after it is felled as practicable, as the females lay their eggs in the bark only. All dead branches likewise should be lopped off close to the stem.

"Ratzeburg mentions several plans adopted in Germany for entrapping the beetles: of these the most successful appear to be—

"1. Pits and trenches with perpendicular sides, dug at frequent intervals round the plantations and along the sides of the paths or road-ways, into which the beetles fall or fly, and from which, being unable to escape, they are to be taken and destroyed.

"2. Bunches of young fir boughs laid about the plantations or in the pits. These are to be shaken daily over cloths, and the beetles collected and destroyed. As soon as the boughs commence to dry they prove unattractive, and must be replaced by fresh ones. Ratzeburg informs us that 2500 beetles have been taken daily from 100 of these bunches or bundles.

"3. Strips of fresh fir bark strewn about the plantations with the inner surface downwards allure the beetles in great numbers; on lifting these the insects are found congregated upon and beneath them.—I remain, &c.,

"EDWARD W. JANSON.

"To W. Elliott, Esq."

Notes on the Habits of a Species of Mantis found at the Cape of Good Hope.

Mr. Smith read the following communication from Mr. Trimen:—

"A Mantis taken on May 13th has, during the two months just elapsed, constructed four nests of eggs, at intervals of about a fortnight. I had the pleasure of seeing her construct one of these, and was rather surprised at her method of proceeding. I used to fancy that the eggs were arranged first, and the structure coated over with cement afterwards; but I found this to be a great mistake. The insect is grass-green, mandibles scarlet, fore tibiæ and tarsi yellow, and band along the abdomen crimson and white. The nest is constructed all in a mass, that is to say, the eggs as they emerge are completely imbedded in a frothy cement so as to be invisible. The emission of the mingled eggs and cement is incessant, and the structure is shaped as it proceeds by the extremity of the abdomen and a sharp trowel-like organ which protrudes from within the abdomen, while the two external filamentous anal appendages are constantly moving over the surface as if to smooth it. The peculiar projection at one end of the nest is the finishing point, and the insect, as if aware that it would drop off if left immediately after formation, sustains the little horn-like process between its anal plates for some minutes, until sufficiently solidified to sustain itself in position. I cannot imagine the use of this curious projection, unless it is to frighten marauding insects or other enemies from devouring the eggs. The eggs, when the cement has dried, give the nest a ribbed appearance: the structure is remarkably firm and hard when dry. The four nests are as nearly as possible of the same size, and of precisely similar shape. The manner of devouring the house-flies I feed my Mantidæ with is peculiarly remorseless and sanguinary. Once having seized its prey, with a sudden, embracing stroke of one or both of its powerful fore legs, the Mantis conveys it to its mouth, and immediately commences to devour it. There is no preparatory wounding or stupefying of the unfortunate victim; the devourer eats regularly down, generally commencing at the eyes, the unfortunate fly struggling to the last bit of muscle he has left; the fly's legs are always devoured, his wings but rarely. The Mantis when hungry would catch and eat portions of 'bluebottles,' but generally dropped it half-devoured, and always if I introduced an ordinary fly. One very large Musca vomitoria that the Mantis attacked, after she had just finished a nest, actually dragged the Mantis round the box, she devouring the back of its thorax all the time! These remarks may probably have nothing but their accuracy to recommend them."—*E. S.*

24 DE60

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